



**ACADEMIA DE GUERRA NAVAL**

**CURSO DE ESTADO MAYOR**

**A PREDICTION OF THE UNITED STATES SOUTHERN COMMAND MARITIME  
SECURITY ENVIRONMENT THROUGH 2045 WITH THE PURPOSE OF  
ESTIMATING REQUIRED NAVAL FORCES:**

**A PROJECTION OF ENDURING U.S. STRATEGIC INTERESTS WITHIN  
PLAUSIBLE SECURITY SCENARIOS**

**Trabajo para optar al grado académico de Magíster en Ciencias Navales y Marítimas y  
a la especialidad de Estado Mayor**

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**LIST OF ABBREVIATIONS AND ACRONYMS**

<b>Abbreviation</b>	<b>Meaning</b>
A2AD	Anti-Access/Area Denial
AFP	Adaptive Force Package
AFRICOM	Africa Command
AGOS	Ocean Surveillance Ship
AH	Hospital Ship
AOR	Area Of Responsibility
AS	Submarine Tender
ASBM	Anti-Ship Ballistic Missile
ASCM	Anti-Ship Cruise Missile
ASuW	Anti-Surface Warfare
ASW	Anti-Submarine Warfare
ATACMS	Army Tactical Missile System
C2	Command and Control
C3	Command, Control and Communications
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CAF	Corporación Andina de Fomento
CCDR	Combatant Commander
CHAMP	Common Hull Auxiliary Multi-Mission
CNO	Chief of Naval Operations
CONEX	Container Express
CS21R	A Cooperative Strategy for 21st Century Seapower (2015 Revision)
CSBA	Center for Strategic and Budgetary Assessments
CSG	Carrier Strike Group
CVL	Aircraft Carrier (conventional propulsion), Light
CVN	Aircraft Carrier (nuclear propulsion)
CVW	Carrier Air Wing
DARPA	Defense Advanced Research Projects Agency
DDG	Destroyer, Guided Missile

DoD	Department of Defense
DSG	Defense Strategic Guidance
EAB	Expeditionary Advance Base
ECLAC	Economic Commission for Latin America and the Caribbean
EEZ	Exclusive Economic Zone
EPF	Expeditionary Transport, Fast
ESB	Expeditionary Sea Base
ESD	Expeditionary Transport, Dock
FDNF	Forward Deployed Naval Forces
FF	Frigate
FFG	Frigate, Guided Missile
FRC	Fast Response Cutter (also abbreviated WPC in USCG literature)
FSA	Force Structure Assessment
FY	Fiscal Year
GCC	Geographic Combatant Commander
GDP	Gross Domestic Product
GFM	Global Force Management
GFMAP	Global Force Management Allocation Plan
HIMARS	High Mobility Artillery Rocket System
HLALC	Heavy Lift Army Landing Craft
IADB	Inter-American Development Bank
IAMD	Integrated Air Missile Defense
IMF	International Monetary Fund
IRBM	Intermediate Range Ballistic Missile
ISR	Intelligence, Surveillance and Reconnaissance
JCS	Joint Chiefs of Staff
LCC	Amphibious Command Ship
LCS	Littoral Combat Ship
LCU	Landing Craft, Utility
LHA	Amphibious Assault Ship (General Purpose)
LHD	Amphibious Assault Ship (Multi-Purpose)
LPD	Amphibious Transport Dock

LSC	Large Surface Combatant
LSD	Landing Ship, Dock
LX(R)	Next-generation dock landing ship
MALE	Medium Altitude Long Endurance
MCM	Mine Counter Measures
MDA	Maritime Domain Awareness
MoD	Ministry of Defence
MCM	Mine Countermeasures
NIC	National Intelligence Council
NM	Nautical Miles
NMO	National Military Objective
NMS	National Military Strategy
NSC	National Security Council
NSS	National Security Strategy
OAS	Organization of American States
OECD	Organization for Economic Cooperation and Development
ONR	Office of Naval Research
OPNAV	Office of the Chief of Naval Operations
PACOM	Pacific Command
PACSCAT	Partial Air Cushion Supported Catamaran
PB	President's Budget
PC	Patrol, Coastal
PC(R)	Patrol, Coastal, Replacement
QDR	Quadrennial Defense Review
RFF	Request for Forces
RFI	Request for Information
RORO	Roll-On/Roll-Off
SA	Security Assistance
SES	Surface Effect Ship
SOUTHCOM	Southern Command
SS	Submarine (conventional propulsion)
SSBN	Ballistic Missile Submarine (nuclear propulsion)



SSC	Small Surface Combatant
SSGN	Guided Missile Submarine (nuclear propulsion)
SSN	Submarine (nuclear propulsion)
T3N	Transnational Threat Network
T-Craft	Transformable Craft. An ONR concept for a long-range, high-speed landing craft.
TLAM	Tomahawk Land Attack Missile
U.K.	United Kingdom of Great Britain and Northern Ireland
U.S.	United States of America
UAV	Unmanned Aerial Vehicle
USCG	United States Coast Guard
USMC	United States Marine Corps
USN	United States Navy
USV	Unmanned Surface Vessel
UUV	Unmanned Undersea Vessel
VLS	Vertical Launch System
WPC	Fast Response Cutter (also abbreviated FRC in USCG literature)
XLUSV	Extra Large Unmanned Surface Vessel
XLUUV	Extra Large Unmanned Subsurface Vessel

## ABSTRACT

The changing maritime security environment has prompted a renewed focus on the fleet architecture of the U.S. Navy (USN), manifested by three independent studies and a major revision to the official Force Structure Assessment (FSA) within the past year. Each calls for significant growth in the U.S. fleet, although they diverge in operational concepts, conceptual fleet design, and the resulting fleet architecture.

This study seeks first to understand the impact of these developments within the U.S. Southern Command (SOUTHCOM) Area of Responsibility (AOR) and then to propose changes to the future fleet architecture as required to achieve long-term U.S. security interests within the AOR. This study surveys abiding U.S. security interests and the hierarchy of strategy documents, from the National Security Strategy (NSS) down to the force provider (USN) and force user (SOUTHCOM) level. This study analyzes the future maritime operating environment through regional long-term trends in maritime security, focusing on the physical environment, demographics, economics, and a brief survey of seven composite futures studies. This study reviews the current shipbuilding plan, an unclassified summary of the FSA, each of the alternative fleet architecture studies, and the Chief of Naval Operations' recent whitepaper *The Future Navy*.

From these three major foundations, this study proposes future presence requirements, operating concepts and platforms. This study assumes that the USN will not acquire vessels having utility only in uncontested environments, and therefore develops operational concepts for the projected future operating environment within SOUTHCOM and supporting high-intensity conflicts in other AORs.

This study proposes a new patrol craft based on the U.S. Coast Guard's *Sentinel*-class Fast Response Cutter (FRC) program to replace the *Cyclone*-class Patrol, Coastal (PC), and eventually developing a large Unmanned Surface Vessel (USV) from this class. This study also proposes a flexible, large-displacement support/auxiliary vessel to replace a variety of aging ship classes and provide more reliable long-endurance presence to the SOUTHCOM AOR. Finally, this study proposes the development of a large Partial Air Cushion Supported Catamaran (PACSCAT) landing craft.

## INTRODUCTION

*“Naval history teaches us one enduring certainty: the United States is, by geography and character, a maritime nation with global interests. And as long as there remains competition for those interests with other maritime nations, its naval officers must continuously look ahead for indicators of change in the character of that maritime competition and ask what that change could mean for how, who and where their reliefs will need to operate and fight in the future.”*

(Sobeck, 2017)

The force structure of the U.S. Navy (USN) is at an inflection point. In the years since the dissipation of the Soviet threat, the USN has largely focused on projecting power from the sea and supporting expeditionary forces ashore. Its capabilities and force structure have reflected this shift away from maritime combat. Since combat operations began in Afghanistan in 2001, the U.S. fleet has shrunk by 41 ships, despite increasing operational demand and lengthened deployments. Facing increasingly capable adversaries in a renewed great power competition, this smaller fleet, still optimized to exploit the relatively uncontested command of the sea, has of late renewed its focus on gaining the command of the sea. This shift in naval focus toward gaining command of the sea, along with the force structure to support it, has garnered increasing political support both in Congress and the White House, indicating that the fleet architecture will grow and change over the next few years. The details of this evolving fleet architecture remain unclear because much is undecided. Based on the ship-category numbers in the latest force structure assessment and the trio of related studies, the composition and operational concepts for the future fleet encompass a wide range of possibilities. In recognition of this decision point and the uncertainty about changes to come, the Fiscal Year (FY) 2018 budget only projects one year in advance, instead of the usual five (Mehta, 2017).

In his recent maritime strategy, the Chief of Naval Operations (CNO) focuses on this changing security environment and the challenges that come with it. He makes absolutely clear that the U.S. Navy must be able to defeat any enemy. While this important mission often commands the most attention, others remain: Protect the nation from attack; preserve strategic influence; deter aggression; and encourage acceptable crisis resolution (Richardson, 2016, p. 1). This portfolio of missions requires a balanced fleet, competent to perform any and all of its missions, globally.

Rather than revisiting the entire fleet architecture, which has already been the subject of four studies or assessments in the past year, this study will focus on applications within the U.S. Southern Command (SOUTHCOM) Area of Responsibility (AOR). It specifically aims to address what naval force requirements the USN will have in the SOUTHCOM AOR through the year 2045 in pursuit of enduring U.S. security interests. To answer this question, the study will proceed to analyze abiding U.S. security interests, regional trends in maritime security, and possible U.S. fleet architectures over the next 30 years, before finally synthesizing recommendations and conclusions from these constituent parts.

## **CHAPTER I: PROBLEM STATEMENT**

### **1.1. Antecedents**

#### **1.1.1. Identification of the origin of the study**

The theme of this project was proposed by the Naval Postgraduate School and has two related but not identical prompts: first, as an academic requirement for the Chilean Naval War College, and second, as a contribution to the USN's ongoing consideration of fleet architecture. The explicit and implicit guidance arising from each initiating authority is broadly coherent but nevertheless distinct. As such, this study is a product of compromise, with a distinct focus and methodology than it would have were it written exclusively for either the USN or the Chilean Naval War College.

The study is fundamentally multidisciplinary, analyzing a diverse array of sources to answer the investigative question. Of the 113 sources referenced or cited, 34 have a significant or primary focus on security strategy, 16 on the current operational environment, 53 on the future operational environment, 52 on naval operations and shipbuilding, and four on the academic application of methodology. Many of the works overlap categories, describing both the future operating environment while proposing what forces may be needed to influence it.

#### **1.1.2. Idea formulation and literature review**

Under Congressional direction (114th U.S. Congress, 2015), the CNO directed three studies of the fleet architecture oriented to the distant future in order to better understand the combination

of capabilities that the USN would need to accomplish its missions. The Navy Project Team conducted an independent study (2016), as did two think tanks: the Center for Strategic and Budgetary Assessments (CSBA) (Clark, et al., 2017) and the MITRE Corporation (2016).

The natural emphasis that the fleet architecture studies place on the most challenging operational scenarios leaves comparatively little focus on the role that naval forces in SOUTHCOM would have in supporting national strategy. A force designed to combat high end threats in one region, such as in the Pacific Command (PACOM) AOR, may not be optimal or even available to address the challenges in the SOUTHCOM AOR.

The enduring security interests of the United States, together with the strategic vision to achieve them, are explained by a hierarchy of strategy documents, including the National Security Strategy of the United States of America (NSS) (Obama, 2015), Defense Strategic Guidance (DSG) (Panetta, 2012), the Quadrennial Defense Review (QDR) (Hagel, 2014), and the National Military Strategy (NMS) (Dempsey, 2015). Subordinate strategy documents relevant to this study are derived from this higher guidance, including the maritime services strategy (Dunford, Greenert, & Zukunft, 2015), the USN (Richardson, 2016), and SOUTHCOM (Tidd, 2017-2027 Theater Strategy, 2017).

Together with U.S. interests and strategies, a survey of the future security environment, both globally and in the region of interest, helps to understand capability requirements. Understanding the future security environment starts with a snapshot of the present, which the Fund For Peace's Fragile States Index (2017) provides. Many of the individual factors that influence long-term regional security – the physical environment, demographics, and economics – have been the subject of focused studies and modeling. Demographic studies include the United Nations (2015) and the Economic Commission for Latin America and the Caribbean (ECLAC) (2016b). Global economic studies include the Organization for Economic Cooperation and Development (OECD) (Johansson, et al., 2012), and the investment firm PriceWaterhouseCoopers (PwC) (2017). Regionally focused economic studies include the Inter-American Development Bank (IADB) (Powell, 2017), the International Monetary Fund (IMF) (2017), ECLAC (2016a), and Corporación Andina de Fomento (CAF) (2010). Along with studies focused on specific factors, composite risk factor studies oriented at the global level help establish the realm of possible geopolitical contexts.

They include the National Intelligence Council's *Global Trends* report (2017), the Atlantic Council (Burrows, 2016), two studies from the United Kingdom (U.K.) Ministry of Defence (MoD) (2014) and (2015), and the U.S. Marine Corps's (USMC) *Security Environment Forecast* (USMC Futures Directorate, 2015). Regionally focused studies include those from the Atlantic Council (Marczak & Engelke, 2016) and the IADB (Bitar, 2016), along with the regional sections of the globally focused studies.

The possible U.S. fleet of 2045 is projected by the current shipbuilding plans (OPNAV N8, 2016), although pending changes to those plans have been partially disclosed through the Force Structure Assessment (FSA) (U.S. Navy, 2016). Three fleet architecture studies, from the Navy Project Team (2016), MITRE Corporation (2016), and CSBA (Clark, et al., 2017), propose distinct visions for both operational concepts and the supporting fleet architecture. Subsequent to the fleet architecture studies, the CNO released a white paper summarizing their key findings and providing his own direction, guidance, and design philosophy for the future navy (Richardson, 2017). Finally, two recent Requests For Information (RFIs) from the Naval Sea Systems Command (NAVSEA) (2017a) (2017b) indicate forthcoming requirements for key platforms.

## **1.2. Formulation of the Problem Statement**

### **1.2.1. General investigative question**

What naval presence requirements will be required to support the enduring security interests of the U.S. through 2045 within the SOUTHCOM AOR?

### **1.2.2. Specific investigative question**

1. What are the abiding interests of the U.S., both globally and within the SOUTHCOM AOR?
2. How will the maritime security environment develop towards the year 2045?
3. What U.S. naval forces are currently planned through 2045?
4. What additional or different naval forces should be planned in order to secure U.S. interests in the region?

### **1.2.3. General objective**

Analyze trends in U.S. security interests, the SOUTHCOM AOR operational environment, and USN fleet architecture through 2045 in order to propose types, characteristics and numbers of naval forces sufficient to achieve U.S. interests.

### **1.2.4. Specific objective**

1. Analyze the requirements of the SOUTHCOM AOR as related to U.S. security interests and strategies.
2. Analyze the trends within the operational environment of the SOUTHCOM AOR related to the physical environment, demographics, economics, and overall security.
3. Analyze and compare the planned and possible USN fleet architectures.
4. Propose specific naval presence requirements.
5. Adapt or develop naval vessel concepts and elaborate on how they would fit into the USN fleet architecture and fleet design, both within the SOUTHCOM AOR and elsewhere.

### **1.2.5. Spatial delimitation**

This study focuses on the SOUTHCOM AOR, as shown in Appendix 1.

### **1.2.6. Temporal delimitation**

This study considers from the present up to and including the year 2045.

### **1.2.7. Organizational delimitation**

The study limits its recommendations to force requirements within the SOUTHCOM AOR as expressed by the type and number of naval vessels, potentially including those that do not meet congressional requirements for ship counting.

The national security apparatus apportions military forces to the Geographic Combatant Commanders (GCCs), including SOUTHCOM, as a function of their Requests For Forces (RFFs) and as part of the Global Force Management Allocation Plan (GFMAP). Historically, the

composite risk to U.S. interests and the resulting force allocation have strongly favored other operational theaters. Thus, continuing instability in the rest of the world will continue to dictate the demand for security forces outside the theater, and consequently the limited availability of forces to the SOUTHCOM AOR. Because this study is limited to a peripheral review of the probable security state of the rest of the world in the distant future, it will articulate the naval force requirements within the theater without explicitly forecasting force availability.

#### **1.2.8. Source restrictions**

This study is unclassified and publically releasable, as it is based exclusively on open-source, publically available documents. Many relevant sources are necessarily excluded from consideration.

This study is limited by the published sources available at the time of writing. The entire hierarchy of national security doctrine changes over time, and with it, the direction and guidance that it provides. This tendency is especially visible after major changes in the executive branch; President Donald Trump's administration has yet to formally articulate a NSS, but it will most likely exhibit substantial changes from the previous document. That said, the national security apparatus takes years or even decades to fully develop forces capable of implementing these new strategies – a process frequently interrupted and re-started by changing security and political environments. For all of these reasons, this study will examine President Barak Obama's 2015 NSS, rather than the unreleased NSS of President Trump. However, forthcoming themes of the pending NSS that have been communicated clearly, consistently and forcibly, such as the shifted position on climate change, will be incorporated in this study to balance the need for expediency against the risk of speculation.

#### **1.2.9. Assumptions**

This study assumes the continued financial health of the U.S. government and its ability to maintain or expand the fleet. Projections of the long term fiscal health of the U.S. government, especially in the areas of non-discretionary entitlement spending and debt servicing, have called into question the viability of maintaining, much less expanding, the existing naval force structure. While explicit considerations of affordability are beyond the scope of this study, it will nonetheless



prefer more cost effective solutions, recognizing that these provide a more realistic path to a larger fleet and the corresponding naval presence.

This study assumes an extrapolation of current U.S. drug and immigration policies that impact the operational demand for naval forces within the SOUTHCOM AOR.

This study assumes that naval platforms will not be acquired for the exclusive use of SOUTHCOM. In order to be useful for SOUTHCOM, a ship must first be acquired; yet in order to be acquired, it must also contribute to the USN high priority missions outside of the SOUTHCOM AOR. This study will therefore conceptualize platforms that can both accomplish typical SOUTHCOM mission sets and contribute to major combat operations. Accordingly, this study primarily examines SOUTHCOM missions and operational concepts but also reviews those required by other GCCs in their respective AORs.

#### **1.2.10. Justification of the investigation**

This study looks 27 years into the future; by way of comparison, the Berlin wall fell some 27 years ago. And yet, the USS *Abraham Lincoln*, commissioned just two days after the fall of the Berlin Wall, could very well serve through 2045. States have always conceived, designed and built naval forces to influence the projected future security environment towards a desired end-state over an expansive period. The objective of this investigative study is not to achieve precise knowledge of the future, but more generally to establish a range of possibilities based on current tendencies, with the objective of making an informed recommendation regarding the quantity, type and characteristics of future naval vessels needed for a specific region. The extensive cost and long service lives of naval vessels, together with the evolving security environment, mean that such investigations are perennially necessary, however low the possible level of certainty. The viability of this investigative project is established by this low level of acceptable certainty, combined with the great quality and quantity of sources. The majority of this investigation simply collects, consolidates, analyzes and synthesizes conclusions already made by experts. The final recommendations, on the other hand, are an imaginative and creative work enabled by the investigative context provided by the rest of the study.

### **1.3. Acknowledgements**

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Whatever errors or omissions may remain in this work are my own.

## **CHAPTER II: CONCEPTUAL FRAMEWORK AND TERMS OF REFERENCE**

### **2.1. Conceptual Framework**

#### **2.1.1. Fleet design**

Fleet design, as distinct from fleet architecture, describes the purpose, planning and intention that exists behind a nation's fleet. It describes the capabilities that a navy expects to need and the operational concepts required to obtain them, but it does not address the exact breakdown of ship classes or precise size of the fleet.

#### **2.1.2. Fleet architecture**

Fleet architecture derives from fleet design. It incorporates the required capabilities and operational concepts into a plan, detailing how many ships, and of what types, will be acquired in the future, where they will be based, how long they will serve, and when they should be retired from service.

#### **2.1.3. Forward deployed naval forces (FDNF)/forward-based naval forces**

Naval forces based outside of the U.S., such as those in Rota, Spain; and Yokuska, Japan.

#### **2.1.4. Rotational forces**

Forces based in the U.S. that deploy on a periodic, rotational basis to other AORs and then return to their U.S. bases.

#### **2.1.5. Forward-operating/forward stationed forces**

Forces operating from a location outside of the U.S. that does not qualify as a "base", such as Littoral Combat Ship operations from Singapore.

#### **2.1.6. Presence**

Naval presence, forward presence, and simply "presence" are all used interchangeably in many of the sources dealing with naval operations. In addition to the generic meaning of a ship

simply being in a given location, its technical meaning is: “number of days a ship spends in an area of operations —excluding depot maintenance periods —divided by 365. Ships homeported overseas are always physically in an area of operations (i.e., in the 4th, 5th, 6th, or 7th Fleet areas of operations); therefore, the Navy calculates that they provide as much as four times more presence than U.S.-homeported ships, which must travel long stretches of ocean before entering one of the overseas areas of operations and then return to the United States after a multimonth deployment.” (Government Accountability Office, 2015, pp. 11-12)

#### **2.1.7. Operational availability (Ao)**

“Operational availability is the number of days a ship is available for operational tasking in a year. Operational availability measures the amount of time that a ship can get under way and execute a mission as required. For example, a ship can be considered operationally available even if it is in maintenance, if it is able to get under way and execute a mission in a short period of time. The Navy calculates that ships homeported overseas provide over three times more operational availability than U.S.-homeported ships.” (Government Accountability Office, 2015, p. 12)

#### **2.1.8. Operational presence**

Operational presence reflects units operating within a given theater and operating, not those that are merely stationed there. To satisfy an operational presence requirement, a ship must be in the theater, operationally available, and underway or otherwise executing a mission. An operational presence requirement of 1.0 means that a GCC needs one ship on station in the AOR for 365 days per year.

#### **2.1.9. Deployed underway time**

“Deployed Underway Time is the number of days a ship spends away from port, referred to as underway days, deployed in the 4th, 5th, 6th, or 7th Fleet areas of operations. This metric tracks the number of days that a ship is out of port, at sea, and performing a mission in these areas of operations.” (Government Accountability Office, 2015, p. 12)

**2.1.10. Comparison of presence metrics for SOUTHCOM**

Since SOUTHCOM does not have forces permanently based within the AOR, the terms of presence, operational availability, operational presence and deployed underway time are much more closely correlated than in PACOM, the European Command (EUCOM), or the Central Command (CENTCOM), each of which have FDNF ships. In these theaters, a ship could have a 1.0 presence, 0.5 operational availability, and 0.25 operational presence, reflecting 81 days of deployed underway time. If a ship is physically present within the SOUTHCOM AOR, however, it is almost always operationally available, operationally present, and deployed underway as well.

## CHAPTER III: METHODOLOGICAL FRAMEWORK

### 3.1. Investigative Paradigm

This research project examines multiple uncertain and overlapping variables and the future influences on and requirements for long-term policy. Therefore, and according to Hernandez, Fernandez and Baptista in chapter 13 of *Metodología de La Investigación*, the best methodology would be qualitative. The available information is simply not suitable for a quantitative study. Specifically, the information is "different or of maximum variation, homogeneous, chain or by networks of cases ends [of time], by chance [missing information that we do not know], theoretical or conceptual, [and] for convenience" (Hernandez, Fernandez, & Baptisa, 2010, p. 393).<sup>1</sup> Within the qualitative category, it is also an evaluative investigation, with the purpose of "identifying the merit or the value of the object of evaluation and aid in decision-making for its change or improvement" (Folgueiras Bertomeu, 2009, p. 17).

### 3.2. Research Propositions

According to Niño Rojas (2011) it "is not common to use variables, hypothesis, or measurement" in qualitative research. This study will therefore establish propositions rather than hypothesizes:

#### 3.2.1. Proposition 1

The security interests of the United States, as described by the most recent NSS (Obama, 2015) will continue without profound alteration.

#### 3.2.2. Proposition 2

Current security trends in the region will improve moderately.

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<sup>1</sup> Unless otherwise noted, all translations from Spanish references are the author's.

### **3.2.3. Proposition 3**

A fleet of 293 ships is currently planned in the year 2045.

### **3.2.4. Proposition 4**

The planned fleet is not sufficient to meet the U.S. interests in the region.

## **3.3. Input Unit of Analysis**

The most suitable analysis units (that is, inputs) for a qualitative study such as this one are:

### **3.3.1. Organizations**

The organizational interests to be analyzed include governments, non-governmental organizations, and inter-governmental organizations. The interests of the governmental organization in this case is manifested by, among other diverse measures, the construction of naval vessels.

### **3.3.2. Communities**

Communities represent the people in the region and their various interactions with, and influences upon, the security environment (Hernandez, Fernandez, & Baptisa, 2010, p. 410).

## **3.4. Output Unit of Analysis**

The product of this analysis will be expressed by the types, characteristics and numbers of naval forces.

## **3.5. Selection of Sample**

### **3.5.1. Determination of sample**

The sample was selected for convenience. It is not obviously not feasible to obtain samples from the future, and it is therefore justifiable to obtain them from recognized forecast studies,

collecting the best data and samples available. Hernandez, Fernandez and Batista write "samples for convenience: simply available cases to which we have access" (2010, p. 401), which applies here.

### **3.5.2. Classification of sample**

A sample for convenience is, by definition, within the category of non-probabilistic samples (Hernandez, Fernandez, & Baptisa, 2010, p. 580).

## **3.6. Determination of Instruments**

Instruments for collecting data are found in a variety of studies, interviews and analysis related to the topic. The diversity and quality of these sources constitute the primary, and in some areas the exclusive, means to collect data. In parallel with this primary instrument, the author has discussed various aspects of the study with a wide range of experts, including experts on the U.S. shipbuilding industry, the SOUTHCOM AOR, Global Force Management (GFM) and national strategy. The multidisciplinary nature of the work, combined with the short time to cover such a broad scope of study, rendered surveys, questionnaires and formal interviews less relevant.

## **3.7. Organization of Data to be Collected**

The studies constituting the input for analysis have been organized according to two main factors: time and purpose. The factor of time is divided between the present and the future. First, the investigation will use studies and documents oriented at the present to form the context and starting point for futures studies. The future-oriented documents then develop this foundation into a better understanding of the future interests, security environment and resources. The second factor to organize the data will be the purpose of the document: is descriptive or prescriptive? Documents that respond to the question "What is the problem?" are descriptive, and documents that propose a solution, or establish policy, are prescriptive.



### **3.7.1. Current/descriptive**

Fund For Peace. (2017, May 10). Fragile States Index 2017. (J. Messner, Ed.) Retrieved from Fragile States Index: <http://fundforpeace.org/fsi/2017/05/14/fragile-states-index-2017-annual-report/951171705-fragile-states-index-annual-report-2017/>

### **3.7.2. Current/prescriptive**

Obama, B. (2015, February). National Security Strategy of the United States of America. Retrieved from U.S. National Archives: [https://obamawhitehouse.archives.gov/sites/default/files/docs/2015\\_national\\_security\\_strategy.pdf](https://obamawhitehouse.archives.gov/sites/default/files/docs/2015_national_security_strategy.pdf)

### **3.7.3. Future/descriptive**

United Nations. (2015). World Population Prospects: The 2015 review, Key Findings & Advance Tables. Department of Economic and Social Affairs, Population Division. New York: United Nations. Retrieved from [https://esa.un.org/unpd/wpp/Publications/Files/Key\\_Findings\\_WPP\\_2015.pdf](https://esa.un.org/unpd/wpp/Publications/Files/Key_Findings_WPP_2015.pdf)

### **3.7.4. Future/prescriptive**

Clark, B., Haynes, p., McGrath, B., Hooper, C., Sloman, j., & Walton, T. a. (2017, January 23). Center for Strategic and Budgetary Assessments. Retrieved from RESTORING AMERICAN SEA POWER: A NEW FLEET ARCHITECTURE STUDY FOR THE UNITED STATES NAVY: <http://csbaonline.org/research/publications/restoring-american-seapower-a-new-fleet-architecture-for-the-united-states->

## **3.8. Determination and Justification of the Qualitative Research Design**

### **3.8.1. Type of research design**

The research will use a non-experimental, longitudinal, design trend, and explanatory scope.

### **3.8.2. Justification of research design**

The justification of the chosen design: Hernandez, Fernandez and Batista explain that these types of investigative design "are those that analyze changes over time (in categories, concepts, variables or relations), within any population in general. Its distinctive feature is that the focus is on the population" (2010, p. 159). This investigative study has a focus on the states and their populations of very high level, and is also very long-term in its scope. Therefore, the chosen design is most suitable for the study. In addition, "explanatory studies go on to the description of concepts or phenomena or the establishment of relationships between concepts" (2010, pp. 83-84) which this research is expected to meet: relate the influence of the field of security and the interests of the U.S. with the naval forces of the future, and propose specifics for those future forces.

## **CHAPTER IV: ANALYSIS OF U.S. NAVAL FORCES ASSIGNED TO THE SOUTHCOM AOR IN 2045**

### **4.1. Abiding Security Interests of the United States of America within the U.S. Southern Command (SOUTHCOM) Area of Responsibility (AOR)**

A hierarchy of strategy documents explain the abiding security interests of the United States and the strategic vision designed to achieve them. At the highest level, the NSS defines and coordinates the long-term ends, ways and means of U.S. foreign policy. It directly informs the military and civilian government entities responsible for the execution of policy and orients their subordinate strategy publications, which include the DSG, the NMS, the strategies for each branch of the armed forces, and the strategies for the six geographic combatant commanders. Naturally, each subordinate layer renders the higher level guidance with increasing specificity, both in terms of force development and force employment. The NSS allows for lateral coordination at the highest level of government, giving Congress insight into the President's strategy to facilitate its budgetary role. The subordinate strategies similarly inform this budgetary process with increasing detail. By defining worldwide priorities, the NSS influences both the generation of military forces and the manner of their use. Therefore this subchapter will examine the current role, content and regional influence of the hierarchy of U.S. security doctrine, down to the level of the combatant commander, to provide a foundation and context for the rest of the work.

#### **4.1.1. National Security Strategy**

President Obama's 2015 NSS was the 16th such report published since Congress required the President to articulate a written national strategy with the Goldwater-Nichols Act of 1986 (Lucas & McInnis, 2016, p. 6). The proposed ways and means described in each successive document have reflected changes in administrations and security environments; President Trump's forthcoming NSS will have its share of changes. Nevertheless, the security *interests*, or ends, have maintained considerable continuity. These persistent interests orient the study as it looks towards the future. President Ronald Reagan's 1987 NSS described U.S. interests as:

1. The survival of the United States as a free and independent nation, with its fundamental values and institutions intact.
2. A healthy and growing U.S. economy

3. The growth of freedom, democratic institutions, and free market economies throughout the world, linked by a fair and open international trading system.
4. A stable and secure world, free of major threats to U.S. interests.
5. The health and vigor of U.S. alliance relationships (Reagan, 1987, p. 4).

Almost 30 years later, the interests presented in the 2015 NSS are remarkably similar, showing relatively minor changes despite the massive shifts in the international security environment and the distinct visions of Presidents Reagan and Obama:

1. The security of the United States, its citizens, and U.S. allies and partners;
  2. A strong, innovative, and growing U.S. economy in an open international economic system that promotes opportunity and prosperity;
  3. Respect for universal values at home and around the world; and
  4. A rules-based international order advanced by U.S. leadership that promotes peace, security, and opportunity through stronger cooperation to meet global challenges.
- [bulleted in original text] (Obama, 2015);

Obama's NSS proceeds from the national security interests to present the strategic risks that could threaten them. This prioritized list gives broad context to force development and force employment:

1. Catastrophic attack on the U.S. homeland or critical infrastructure;
  2. Threats or attacks against U.S. citizens abroad and our allies;
  3. Global economic crisis or widespread economic slowdown;
  4. Proliferation and/or use of weapons of mass destruction;
  5. Severe global infectious disease outbreaks;
  6. Climate change;
  7. Major energy market disruptions; and
  8. Significant security consequences associated with weak or failing states (including mass atrocities, regional spillover, and transnational organized crime). [bulleted in original text]
- (Obama, 2015, p. 4)

The Trump administration has already rejected climate change as a prioritized risk and suggested that many other aspects of the previous NSS will change. Even so, the relative continuity in the national interests presented by past NSSs suggest that these promised changes

will not irrevocably alter the fundamental trajectory of U.S. national security policy in the three decade time horizon. Some of President Trump's national security policy statements will find expression in the forthcoming NSS. How these policies might be selected, prioritized, and expressed in the next NSS, however, remains a matter of speculation and therefore beyond the scope of this study.

Several of the risks in President Obama's list are global challenges, others apply more urgently to other regions, and some have special relevance within the SOUTHCOM AOR. Even though the magnitude of security challenges in the region currently pales in comparison to those of the Middle East or South Asia, the close proximity of the region to the United States magnifies their relative importance. A failed state on the level of Syria but located in Central America or the Caribbean would have greater and more direct security consequences to U.S. interests than that same failed state elsewhere. These overarching risk priorities applied to the SOUTHCOM AOR help orient force development and develop force employment situations.

#### **4.1.2. 2012 Defense Strategic Guidance, 2014 Quadrennial Defense Review, and the 2016 Defense Posture Statement**

While the NSS orients all the tools of national power as directed from a Presidential perspective, the DSG, which is released by the Secretary of Defense, articulate long-term priorities for the Department of Defense (DoD). "Sustaining U.S. Leadership: Priorities for 21<sup>st</sup> Century Defense," describes its purpose as:

A defense strategy that transitions our Defense enterprise from an emphasis on today's wars to preparing for future challenges, protects the broad range of U.S. national security interests, advances the Department's efforts to rebalance and reform, and supports the national security imperative of deficit reduction through a lower level of defense spending... It is intended as a blueprint for the Joint Force in 2020, providing a set of precepts that will help guide decisions regarding the size and shape of the force over subsequent program and budget cycles. (Panetta, 2012, p. 1)

Force providers and force users, principally the Joint Chiefs of Staff (JCS), the civilian service secretaries of the military departments, and the combatant commanders, exercise significant

influence over the DSG's composition. Using long-term projections of the future security environment and expected military missions as a foundation, it then recommends guidelines for the development and prioritization of the future joint military force structure, as facilitated by the entire DoD, in order to accomplish the missions identified in the NSS (Panetta, 2012).

The DSG proposes that nations whose viewpoints and interests overlap in the areas of freedom, stability and prosperity – explicitly including Latin America in this category – share the costs and responsibilities of global leadership. To better achieve this goal, it proposes building partnership capacity and seeking to be the security partner of choice. This effort is characterized by *“innovative, low-cost, and small-footprint approaches to achieve our security objectives, relying on exercises, rotational presence, and advisory capabilities”* (Panetta, 2012, p. 3). The highest levels of strategic guidance conceive of the SOUTHCOM AOR as an economy-of-force theater; this has consequences for the development and utilization of forces through the rest of the strategic hierarchy.

Overall, the DSG, published in 2012, projects a smaller, better integrated, and more agile joint military force, shifting focus away from conducting large stability operations like those in Iraq and Afghanistan. The 2014 QDR builds on the base of the DSG, emphasizing a triple rebalancing: rebalancing *“for a broad spectrum of conflict”* (Hagel, 2014, p. VII), rebalancing *“our presence and posture abroad to better protect U.S. national security interests”* (Hagel, 2014, p. VIII), and rebalancing the *“capability, capacity, and readiness within the Joint Force”* (Hagel, 2014, p. VIII).

Although the DoD has not issued another DSG or QDR since President Obama's 2015 NSS, Secretary of Defense Carter's Defense Posture Statement, which accompanied the President Obama's FY2017 defense budget submission, provides a more detailed and up-to-date vision of threats, priorities, and recent changes. While previous high-level strategic documents did identify China and Russia as strategic competitors, they did not acknowledge a wholesale return to an era of great power competition, or call for the associated military investments, in the explicit way that the recent Defense Posture Statement did. Of the five evolving challenges that drive the DoD's planning and budgeting, *“two of these challenges reflect a recognition of – a return to, in some ways, – great power competition”* (Carter, 2016, p. 4). More explicitly, these challenges are Russian aggression in Europe and aggressive Chinese behavior in the Asia-Pacific theater. The

increasing priority given to the development and employment of high-end forces could absorb more and more resources, resulting in limited force availability for the SOUTHCOM AOR.

#### 4.1.3. National Military Strategy: The United States Military's Contribution To National Security

Every well-crafted strategic document presents a holistic vision of ends, ways, and means, but each level of doctrine may emphasize one element over others. The NSS focuses more on the ends; the DSG (along with the QDR) concentrates on the development of the means. In contrast to the higher-level documents, the NMS “describes *how* we will employ our military forces to protect and advance our national interest” (Dempsey, 2015), which is to say, the *ways*. It describes a strategic environment characterized by “complexity and rapid change” and “driven by globalization, the diffusion of technology, and demographic shifts” (Dempsey, 2015, p. 1). The military environment within this strategic context contains a wide range of possible conflicts, as shown in the graphic below:

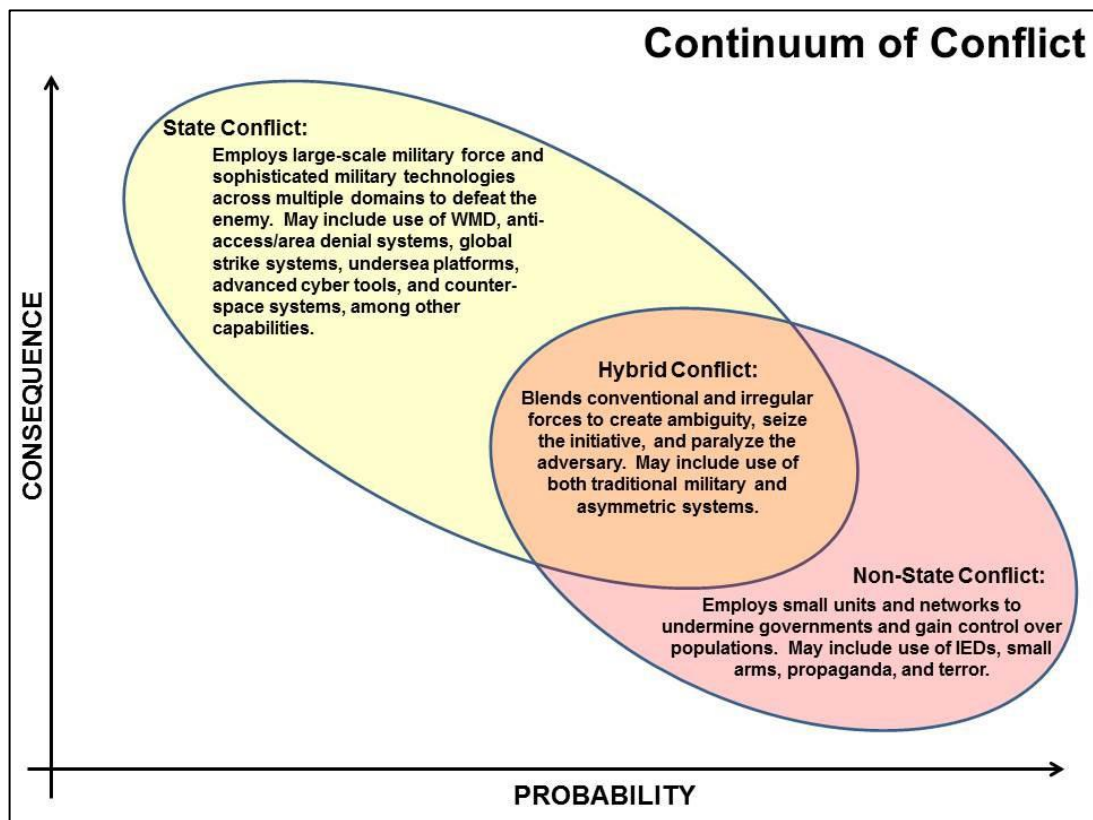


Figure 1: Continuum of Conflict (Dempsey, 2015, p. 4)

After reiterating the U.S. Enduring National Security Interests found in the NSS, the NMS succinctly identifies the following National Military Objectives (NMOs):

- Deter, deny, and defeat state adversaries.
- Disrupt, degrade, and defeat violent extremist organizations.
- Strengthen our global network of allies and partners. (Dempsey, 2015, p. 5)

These NMOs drive long-range force development for the entire military force. The following subchapter on the SOUTHCOM security environment will examine the risk to these objectives in greater detail. However, this paragraph gives some initial context. First, the threat of interstate conflict is more remote, by an order of magnitude, in the Western Hemisphere than the Eastern. Second, violent extremist organizations, exploiting transnational threat networks and disaffected populations to achieve their aims, constitute a relatively greater risk in the region. The third objective of strengthening the network of allies and partners has the far greater relevance next to the other two objectives, and also happens to be one of the best ways to achieve them. The NMS elaborates on how the U.S. military will help strengthen a global network of allies and partners:

As we look to the future, the U.S. military and its allies and partners will continue to protect and promote shared interests. We will preserve our alliances, expand partnerships, maintain a global stabilizing presence, and conduct training, exercises, security cooperation activities, and military-to-military engagement. Such activities increase the capabilities and capacity of partners, thereby enhancing our collective ability to deter aggression and defeat extremists. (Dempsey, 2015, p. 9)

The only explicit mention of the SOUTHCOM AOR is found under this same heading, stating that “the U.S. military is supporting interagency efforts with Latin American and Caribbean states to promote regional stability and counter transnational criminal organizations” (Dempsey, 2015, p. 9), underscoring that, from perspective of the JCS, the most relevant objective for SOUTHCOM involves support to other agencies and engagement with allies and partners.



The joint force prioritized missions list articulates the relative importance for missions to achieve the NMOs discussed above. Missions 1-3 and 11 have limited relevance in the SOUTHCOM AOR.<sup>2</sup> The remainder should orient the regionally focused process of naval force development:

1. Maintain a secure and effective nuclear deterrent
2. Provide for military defense of the homeland
3. Defeat an adversary
4. Provide a global, stabilizing presence
5. Combat terrorism
6. Counter weapons of mass destruction
7. Deny an adversary's objectives
8. Respond to crisis and conduct limited contingency operations
9. Conduct military engagement and security cooperation
10. Conduct stability and counterinsurgency operations
11. Provide support to civil authorities
12. Conduct humanitarian assistance and disaster response. (Dempsey, 2015, p. 11)

The 4<sup>th</sup> priority mission, provide a global, stabilizing presence, has special relevance for naval forces in SOUTHCOM AOR. Of the 31 nations and 16 dependencies in the region, only two nations, Bolivia and Paraguay, lack a salt water coastline. Presence is a fundamental aspect of engagement and enables so many of the other missions on the list. Naval forces are uniquely able to provide such a capability in this region.

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<sup>2</sup> The “civil authorities” in mission #11 are government entities within the U.S., not foreign governments.

#### **4.1.4. A Cooperative Strategy for 21<sup>st</sup> Century Seapower**

“A Cooperative Strategy for 21<sup>st</sup> Century Seapower: 2015 Revision,” (CS21R) describes the coordinated design, organization and employment of the USN, USMC and U.S. Coast Guard (USCG) in support of national strategy. The theme of cooperation expressed in the NSS, DSG and NMS finds continued resonance in CS21R, starting with the very title. The strategy presents two foundational principles: first, that “U.S. forward naval presence is essential to accomplishing the ... naval missions derived from national guidance” (Dunford, Greenert, & Zukunft, 2015, p. 2), and second, that “naval forces are stronger when we operate jointly and together with allies and partners” (Dunford, Greenert, & Zukunft, 2015, p. 2). Although Geoffrey Till opined that, in contrast to the original 2007 version, “the relative absence of discussion on the advantages of naval diplomacy in winning friends and influencing people seems a pity” (2015, p. 43), the emphasis on partnership has not disappeared. Rather, it has been displaced, in part, by discussion of a “growing range of challenges in gaining access and operating freely in the maritime commons” (Dunford, Greenert, & Zukunft, 2015, p. 8), an oblique reference to the Anti-Access/Area Denial (A2AD) technology as developed and employed by China, Russia, and others.

CS21R brings the force structure dilemma posed by the NMS into a naval context: National interests demand that U.S. naval forces must have both the high-end capabilities required to defeat a near-peer adversary while retaining the force structure needed for basic presence and naval cooperation missions. Fiscal constraints proscribe a simple expansion of the current fleet, dictating new operating concepts and reprioritized capabilities to cover both extremes instead.

The naval strategy provides some examples of how to develop and employ such a broadly capable force. It describes force employment innovations such as forward-basing; leveraging allied and partners to increase presence, agility and responsiveness; naval platforms designed for modular payloads; better tailoring specific forces for specific missions with Adaptive Force Packages (AFPs); and using these AFPs to “enable persistent engagements that build the capacity of allies and partners to respond to future crises” (Dunford, Greenert, & Zukunft, 2015, pp. 9-10).

CS21R departed from previous U.S. naval strategies by prescribing a more regionally focused force-employment construct that more closely “aligns capability and capacity to mission

demands.” It describes actions for the Western Hemisphere far more explicitly than any of the higher level strategic documents, and as such, it bears repeating here:

We will strengthen partnerships and capacity in the Western Hemisphere to protect the homeland and to counter illicit trafficking and transnational criminal organizations. Coast Guard recapitalization efforts will produce a fleet of highly capable, multi-mission ships and aircraft, including the Offshore Patrol Cutter and the C-27J Spartan maritime patrol aircraft to counter threats, particularly in the Caribbean Sea, Gulf of Mexico, and eastern Pacific Ocean. The Navy will maintain its base at Guantanamo Bay, Cuba, to support joint and combined military operations and to enhance interagency efforts to develop regional security and cooperation. The Marine Corps will employ task forces or SPMAGTFs to support security cooperation activities that increase interoperability with regional partners and strengthen their capacity to interdict transnational criminal organizations. We will employ amphibious ships and other platforms, including Littoral Combat Ships, Joint High Speed Vessels, Afloat Forward Staging Bases, hospital ships, other Military Sealift Command ships, and Coast Guard platforms, to conduct humanitarian assistance and disaster response missions. We will also employ maritime patrol aircraft such as the P-8A Poseidon and unmanned aerial vehicles. Other ships and aircraft will provide periodic presence for recurring military-to-military engagements, theater security cooperation exercises, and other missions. (*Dunford, Greenert, & Zukunft, 2015, p. 18*)

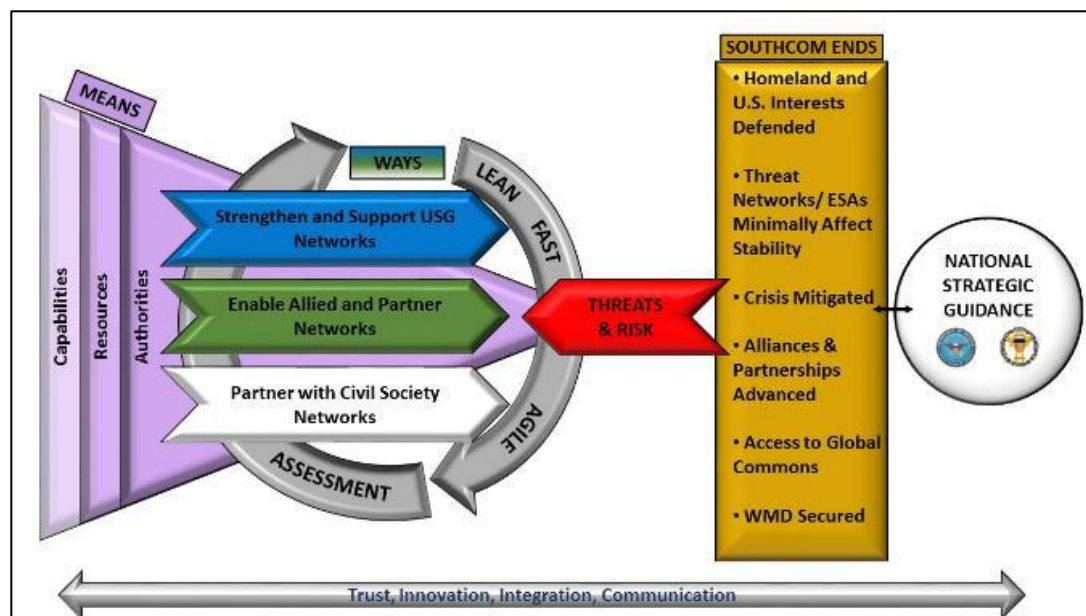
#### **4.1.5. A Design For Maintaining Maritime Superiority**

Admiral Richardson’s “A Design for Maintaining Maritime Superiority” outlines a succinct, USN-oriented design for achieving the aims laid out in CS21R. As a design, unlike a plan (a distinction it emphasizes), it acknowledges “that there is inherent and fundamental uncertainty in both the problem definition and the proposed solution” (Richardson, 2016, p. 4). To confront this doubly uncertain situation, it proposes four lines of effort, two of which can help guide naval force

development oriented toward the SOUTHCOM AOR. The first of these, strengthening naval power at and from the sea, emphasizes the development of new capabilities and operating concepts to deter, deescalate, fight and win through the full spectrum of conflict. It also identifies an effort to reinvent the fleet by exploring alternative fleet designs, and by providing new platforms to implement these new operating concepts (Richardson, 2016, p. 6). The final line of effort, expanding and strengthening our network of partners, seeks to deepen operational relationships with international allies and partners (among others): “Prioritize key international partnerships through information sharing, interoperability initiatives, and combined operations; explore new opportunities for combined forward operations” (Richardson, 2016, p. 8).

#### **4.1.6. SOUTHCOM Strategy**

The recent USSOUTHCOM 2017-2027 Theater Strategy (Tidd, 2017) identifies transnational threat networks (T3Ns) as the principal threat to regional security and stability due to their ability to undermine already weak institutions, including governments. The Theater Strategy takes a broader view of this threat than the historically limited focus on drug trafficking, connecting them with terrorist financing, human trafficking and weapons smuggling. Additionally, the strategy identifies the growing influence of Russia, China, and Iran as a potential threat to the principles that underlie the Inter-American structure of peace and cooperation. In response, Admiral Tidd calls for a network of partners to protect the southern approaches to the U.S., emphasizing the imperative to support interagency partners within the U.S. government; expand relationships with allied and partner nation networks; and partner with civil society.



**Figure 2: USSOUTHCOM Strategic Approach**

*(Tidd, 2017-2027 Theater Strategy, 2017, p. 5)*

In his recent testimony before Congress, Admiral Tidd detailed the challenges inherent to executing this strategy without the resources to do so:

Our detection and monitoring challenges are due in part to the low number of U.S. Navy platforms available to support JIATF [Joint Interagency Task Force] South's mission. Since 2007, Navy long and medium range ship allocation has steadily decreased. The last time we were above 1.0 [operational presence of these ships] was 2014—and, not by much. Since 2015, when the Navy's frigates were decommissioned, we have averaged a Navy presence of less than .50. ... Coast Guard partners are doing everything they can, ... helping us partially fulfill a portion of our... obligations. The USCG, however, cannot be the indefinite bill-payer for our statutory mission. This Committee is well aware of the maritime platform gaps we have experienced for the past few years. In the near term, we are exploring non-traditional alternatives to fill these requirements until more Littoral Combat Ships are in the fleet and available for assignment to USSOUTHCOM. (POSTURE STATEMENT OF ADMIRAL KURT W. TIDD COMMANDER, UNITED STATES

SOUTHERN COMMAND BEFORE THE 115TH CONGRESS SENATE  
ARMED SERVICES COMMITTEE, 2017, p. 32)

Put another way, naval presence matters. SOUTHCOM will do what it must with the assets available, but a predictable and adequate supply of naval platforms helps ensure that it can accomplish its statutory roles in support of national strategy. The following subchapters will bound the range of future security scenarios and formulate the kinds and quantities of platforms that could help fulfill the plausible mission sets. The inadequate status quo of 0.5 operational presence for medium to long range ships mentioned by Admiral Kidd establishes the absolute, bedrock minimum for that analysis to build upon.

#### **4.1.7. The application of strategy to future force structure**

The foundational security documents show links between each descending level of the hierarchy. While security doctrine does change, it does so slowly and unevenly, taking years to incorporate new guidance into lower levels, and years more to implement these changes, finally producing forces with new capabilities. The desired end state of national security interests changes least of all, as demonstrated by the evolution of the NSS over the course of four decades.

Small changes at the highest level, of course, can beget much larger changes in derivative doctrine. While national interests change slowly, the security environment changes far more rapidly, producing continuous alterations in the ways and means designed to achieve the end of the national interest. By projecting these abiding security interests into the plausible Western Hemisphere security challenges through 2045, one can infer the development of the physical means and conceptual ways within the naval context.

This review of strategy documents has also revealed specific guiding attributes, both generally for the overall development of future joint forces and particularly for naval forces intended for deployment within SOUTHCOM AOR. Admiral Tidd's remarks underscore the fundamental importance of the ship being present. To be present, it must be available, and not deployed elsewhere, undergoing maintenance or retired. Affordability supports a more robust fleet architecture, which in turn supports this goal of availability and presence. However, affordability

must not inhibit mission capability or flexibility. As discussed in CS21R, platforms must be flexible enough to support a wide variety of missions throughout AORs. The platform attributes of availability, affordability, capability, and flexibility, as distilled from these foundational strategy documents, form an initial approach that the following subchapters will develop.

#### **4.2. Regional Trends in Maritime Security**

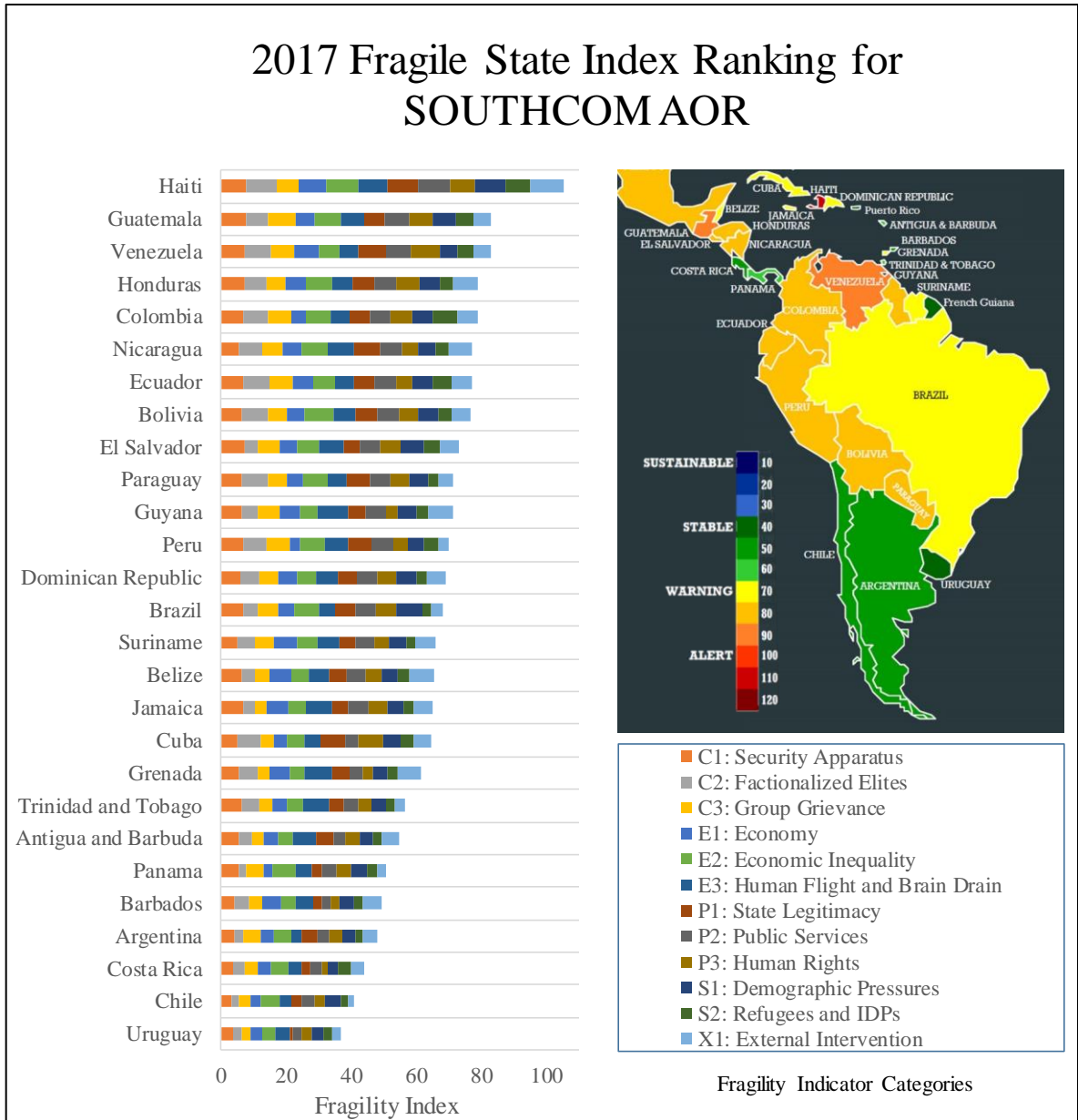
This subchapter will assess regional trends in maritime security by presenting how key factors of the operational environment may change over time, followed by specifically maritime challenges and associated naval missions.

U.S. military doctrine encourages a holistic approach to the operational environment, analyzing such factors as political, military, economic, social, information, infrastructure, physical environment, and time (PMESII-PT) (Ducote, 2010). Although such a perspective may be adequate for near term problems, the fluid interrelation between these factors, compounded over decades, complicates the direct application of this method to long-term forecasting. Several factors emerge as fundamental, dominant and independent, while the remainder are best predicted through the study of these fundamentals. First, and least subject to change over time is the physical environment. Second, societies usually take generations to change in demographics, identity, values, and attitudes. Finally, fundamental economic factors usually take decades to change. Government structures, military power, information networks, and infrastructure are the long term second order effects of these three fundamental factors.

Each of these primary factors can also change in seemingly unpredictably ways. Wars, natural disasters, migrations, epidemics, technology, economic crisis and ideology have each overturned seemingly immutable orders in one or more of these three categories throughout modern history. Even prescient futurists regularly miss these black swan events in real time, to say nothing of a 30 year time horizon. Nonetheless, analyzing the three fundamental factors of the physical environment, the “human terrain” of societies through demographics, and economics, helps delineate the array of possibilities in the long-term regional maritime security environment.

Before analyzing the development of these factors, however, a brief look at the status quo for regional security and stability will help contextualize future developments. The Fragile States Index analyzes 12 indicators, grouped under cohesion, economic, political process, society, and external intervention, to produce a composite score of each state’s fragility environment, as shown in the figure below.





**Figure 3: 2017 Fragile State Index Ranking for SOUTHCOM AOR**

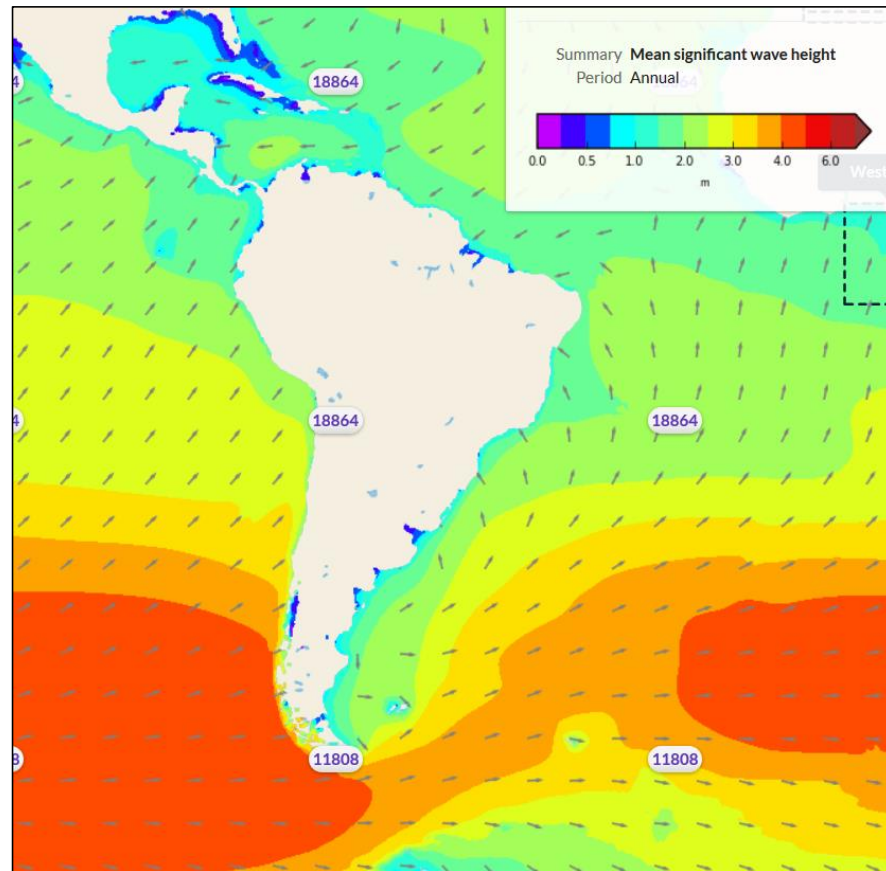
*(Fund For Peace, 2017)*

#### **4.2.1. Physical geography**

Three distinct geographic regions compose the maritime and littoral portions of the SOUTHCOM AOR: the Caribbean (excluding Puerto Rico and the U.S. Virgin Islands), the Pacific Coast of South and Central America, and the Atlantic Coast of South America. Each of these sub-regions is characterized by distinct maritime operating environments, security requirements, security actors, and adjacent GCC AORs.

The Caribbean is the closest sub-region to the U.S. among the three, the smallest, and the most insular. It borders or encompasses over 30 states or sovereign territories in Central America, the Caribbean coast of South America and islands within the Caribbean Sea. Hemmed in by North, Central and South America, the Caribbean maritime operating environment has short transits and, apart from the perennial hurricanes, relatively benign sea states. Both of these factors are relevant in vessel selection.

The entire Caribbean basin and Gulf of Mexico are within 2,000 steaming miles of Naval Station Norfolk, the same distance between the Forward Deployed Naval Forces (FDNF) base in Rota, Spain and the Levant. The proximity of bases in Norfolk, Mayport and San Diego lessens the need for forward deployment within the AOR. The mere ability to rapidly deploy forces to an area can dissuade potential enemies and reassure existing allies and partners. Even so, deployments to a region create influence in ways that theoretical presence never can, engaging those allies and partners in a way that fosters better security relationships while gaining a better understanding of the local operational environment.



**Figure 4: SOUTHCOM AOR Annual Mean Significant Wave Height**  
(HINDCAST, 2017)

The Caribbean is a global crossroad, connecting South and Central America with the U.S. mainland, Western Europe and Africa with the Asia-Pacific region through the Panama Canal, facilitating all manner of licit and illicit commerce in its waters and airspace. For all the above, the Caribbean has elevated importance to the naval forces of SOUTHCOM.

The Pacific Coast of South America and Central America includes Chile, Peru, Ecuador, Colombia, Panama, Nicaragua, Honduras, El Salvador and Guatemala; while the coastal and equatorial regions enjoy moderate sea states, the overall distances are far longer than the Caribbean and the maritime operating environment is relatively more demanding. Additionally, the sub-region borders on the Panama Canal. Much of the drug traffic that ends in the U.S. originates in

the Andean regions of Peru, Bolivia, Ecuador and Columbia, and transits through the eastern Pacific or western Caribbean. This sub-region borders on the PACOM AOR, which presents the one of the most challenging operating environment for the USN, both through distance and great power competitors. For operational flexibility, a vessel that is envisioned to deploy to the eastern Pacific should also be capable of transiting to the western Pacific and integrating with a larger naval force.

Finally, the Atlantic Coast of South America consists of Brazil, Uruguay and Argentina, and borders on the Africa Command (AFRICOM) AOR. As with the Pacific Coast, the distances are significant and the maritime operating conditions relatively demanding. However, AFRICOM is in many ways an economy of force AOR, and U.S. interests in the maritime gap between SOUTHCOM and AFRICOM are likewise present but limited.

Looking forward to 2045, several geographic possibilities emerge within the SOUTHCOM AOR. First, the Panama Canal will likely expand with a 4<sup>th</sup> set of locks, designed to handle much larger ships (Gardner & Moreno, 2015). This will increase the overall maritime traffic and the importance of the chokepoint. The proposed Nicaragua Canal could have the same effect, but the project has yet to show much progress and may very well fail (Costantini, 2016). Second, although not a purely geographic consideration, the basing afforded by Guantanamo Bay within the AOR could eventually disappear as part of a larger political rapprochement between the U.S. and Cuba. According to ADM James Stavridis, “It’s probably inevitable that we’ll have to give [Guantanamo Bay] back to Cuba, but it would take a lot of diplomatic heavy-lifting” (Miroff, 2015). Basing in Puerto Rico or the U.S. Virgin Islands could replace the role of Guantanamo Bay, leveraging existing strategic positions that are virtually inside the AOR. Barring those options, the proximity of major U.S. naval bases to the region, including Norfolk, Mayport, and San Diego, would mitigate the impact of losing Guantanamo Bay, though at the cost of increased transit times.

#### **4.2.2.Demographics, culture and society**

Regions and nations are fundamentally defined by their societies, and societies are defined by their people. At an individual and familial level, some people have children, work, grow the economy, pay taxes, fund the government, and join the armed forces. Other people have a great

many children, demand subsidies, riot, destroy infrastructure, undermine the government and form armed rebellions. Still other people never reproduce, then grow old and die. The degree to which any one of these crude demographic vignettes characterizes a country will, logically, have distinct consequences for regional security. A RAND Corporation study underscores that, “while demographic phenomena per se are seldom a cause of conflict, they can – in particular environments – heighten existing tensions or exacerbate other factors that precipitate armed conflicts” (Nichiporuk, 2000, p. xi).

Although the conventional framing of demographic impacts on tend to focus on rapid population growth, and how it diminishes international stability and state power through a variety of mechanisms (Thayer, 2009, p. 1), other demographic trends also have security repercussions. In chronically youthful states, governments struggle to cope with the demands of rapid urban growth and high unemployment, frequently leading to weak institutions and political violence. This environment creates a strong “push” factor for mass migration, particularly when several chronically youthful states are clustered together in a region. When youthful states experience a demographic transition through declining birthrates and increasing life expectancy, the formerly destabilizing youth bulge becomes a demographic dividend: a large working age population that can fuel economic growth and facilitate stable institutions, while responsible for proportionally fewer dependents.

However, this transition represents a window of opportunity. After 50 years or so, this population bulge will age out of the workforce and retire, requiring increasing resources from a proportionally smaller workforce. Additionally, societies with advanced population ages typically have smaller military recruitment pools and therefore favor technologically advanced militaries to offset their smaller size. Next, affluent societies with aging populations and stagnant or shrinking workforces provide a “pull” factor for massive migration. The new migrants often retain their culture and higher fertility rates, resulting in a differential growth rates between the old, majority population and the ethno-culturally distinct newcomers, even generations after the initial migration. This tension can result in sharp political rhetoric and even violence. Finally, the demographic trend towards urbanization, particularly in megacities, changes the physical context for society, politics, and warfare (National Intelligence Council, 2017, pp. 164-166).

The U.N. estimates that the combined population of the Caribbean, South America and Central America<sup>3</sup> will grow 20% from 2017 to 2045, increasing from 650 to 776 million people. The working age population (aged from 15 to 64 years) will remain stable, gradually dropping from 70% to 65% of the population, but growing in absolute terms, from 434 to 500 million people. Some more developed countries in the region, such as Chile, have recently passed the midpoint of the demographic window, as marked by the apex of the working age population as a percentage of the whole. Each country in the region is projected to reach this midpoint by 2045, largely in order of their development: Brazil in 2020 and Haiti in 2045. The entire region is in the midst of a demographic transition. Significant for maritime security, population growth in several poorer regions, including Haiti and Central America, will continue to outpace the rest of the region.

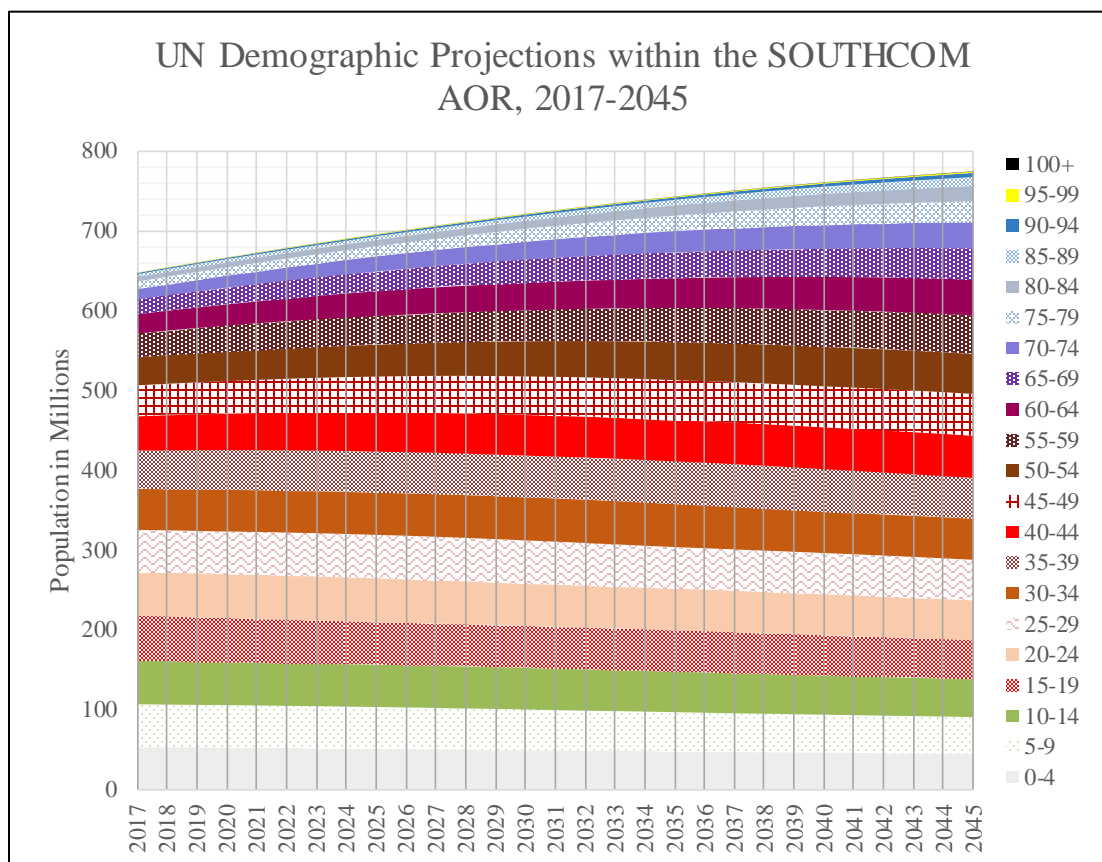
Over the same period of 2017-2045, the population of the U.S. is estimated to grow by 17%, from 326 to 381 million. The U.S. working age population is projected to drop from 66% to 61% of the total, but to grow in absolute terms, from 214 to 231 million people.

In contrast, the populations of both great power competitors identified in the previous subchapter are projected to shrink: Russia by 9%, from 143.3 to 130.6 million, and China by 1%, from 1.39 to 1.37 billion. The absolute change in working age populations is even more dramatic, dropping by 15% in Russia (from 98 to 83 million) and 17% in China (from 1.00 billion to 833 million) (United Nations, 2015).

The figure below illustrates the stable, positive demographic trends for the region.

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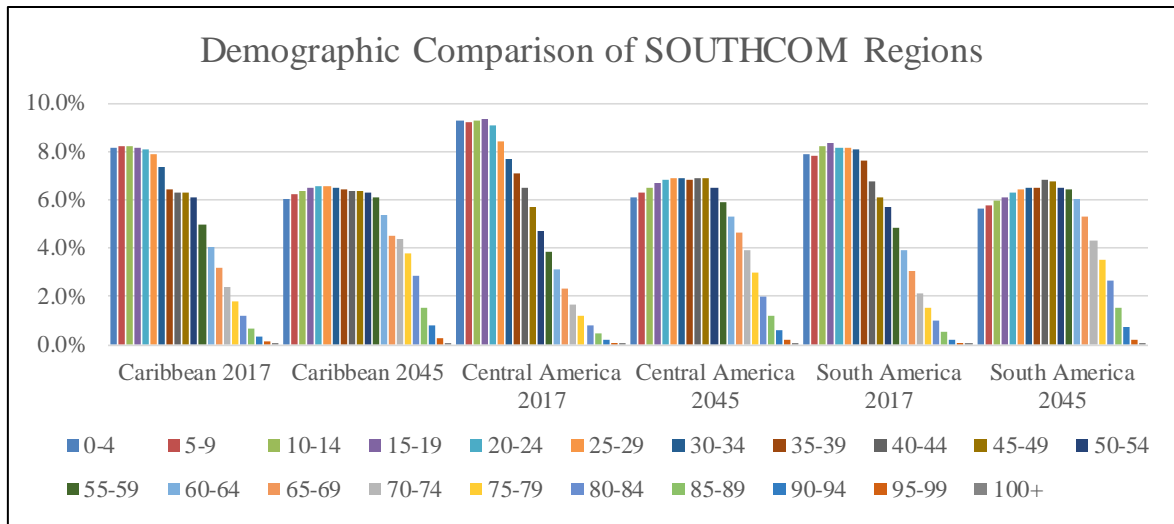
<sup>3</sup> For demographic analysis, these regions will be treated as functionally equivalent to the SOUTHCOM AOR despite minor differences. This subchapter uses the UN's medium population model estimate, but the calculations are the author's.



**Figure 5: UN Demographic Projections within the SOUTHCOM AOR, 2017-2045**

*(United Nations, 2015)*

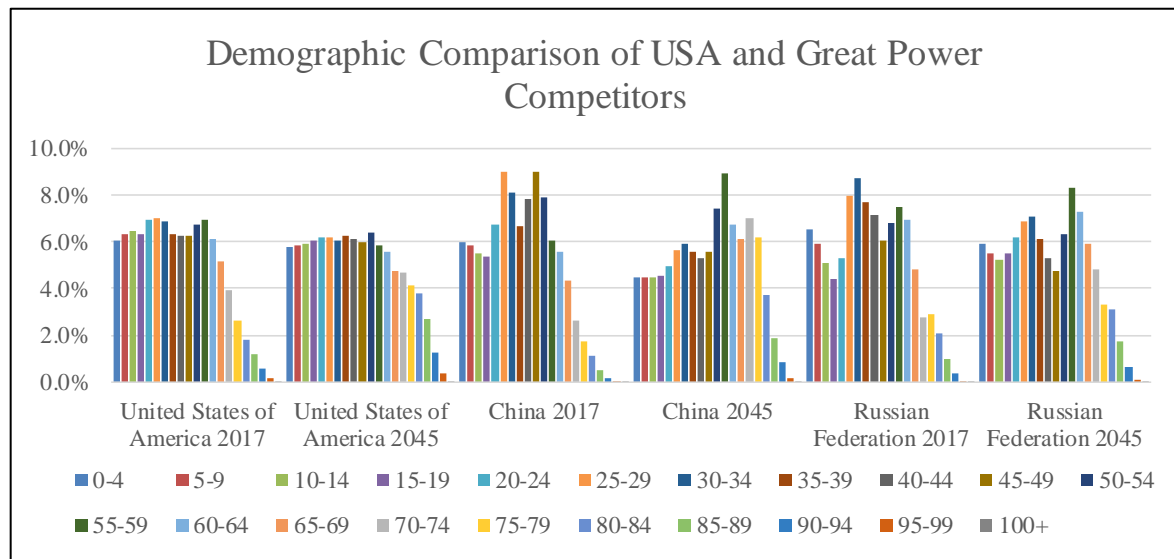
The figure below shows the significant increase in working-age adults and decrease in young dependents between 2017 and 2045 within the Caribbean, Central America, and South America.



**Figure 6: Demographic Comparison of SOUTHCOM Regions**

*(United Nations, 2015)*

The figure below contrasts the aging population trends in the U.S., China and Russia.



**Figure 7: Demographic Comparison of USA and Great Power Competitors**

*(United Nations, 2015)*

At a regional level, the population within SOUTHCOM is in the midst of a demographic window that may facilitate regional development and economic growth, but as the next section on



economics section will discuss, this growth will be distributed unevenly though the countries in the area. States with weak institutions may lack the means to capitalize on these abundant human resources. These same fragile states will likely lack the means and relative interest to prevent massive migration; in many cases, preventing and addressing it will default to the U.S. government.

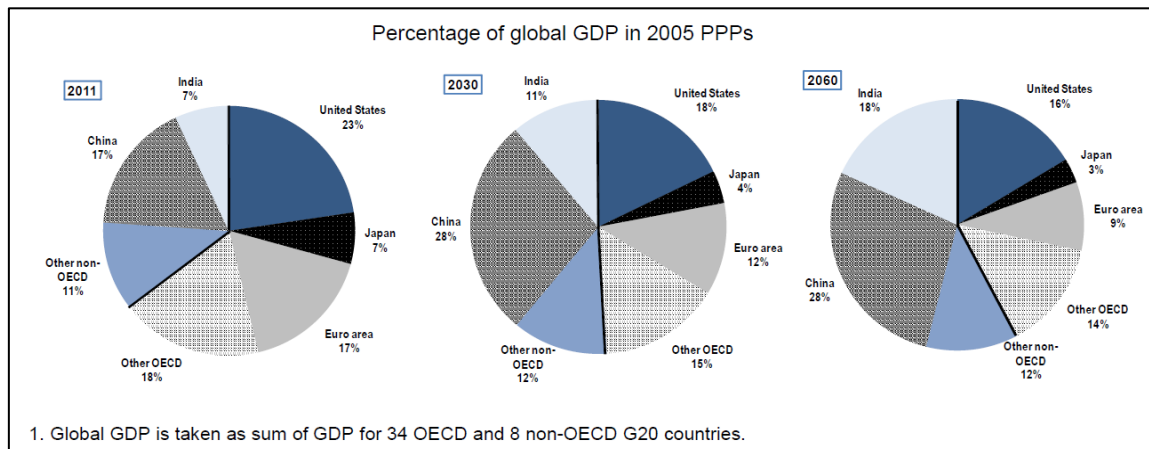
Every single element of the Diplomatic, Informational, Military, Economic model of national power involves people; national power quite simply requires human capital. U.S. demographic trends are a “bright spot” amongst affluent Western countries, with a growing, gradually aging population that assimilates immigrant populations with relative ease. Roughly half of projected U.S. population growth will come from migration (Eberstadt, 2011, p. 35). The long term demographic trends of Russia and China are not as positive. In each of these cases, demographics are not destiny, but they do provide an important context and influence on future events.

#### **4.2.3. Economics**

Within an interconnected world, external forces increasingly shape a country’s economic capital, resources, policies and overall wealth. A stock market crash, sovereign debt crisis or commodity bubble can ripple to the other side of the world at the speed of information, deeply influencing economies that have seemingly peripheral connections. The small size and generally open nature of economies within SOUTHCOM makes them especially vulnerable to global economic forces (Powell, 2017, p. 1). Even within this globalized economic context, national economies still develop on their own terms: squandering resources or putting them to productive use, favoring liberalized free trade or closed neomercantilism, facilitating entrepreneurialism or emigrational brain drain. Both international and national economic trends, therefore, influence the requirements and provisions for maritime security. This part of the subchapter will examine the global and regional economic trends in sequence.

Two studies present very long range economic futures. First, a policy paper from the OECD projects overall global economic growth of up to 3% through 2060, assuming certain gradual structural reforms. The economic growth of non-OECD countries, which are generally less developed, will continue to exceed that of OECD countries, but the gap will narrow as the non-

OECD countries become wealthier and their growth slows. The combined economies of the two largest non-OECD economies, China and India, will make up 46% of world Gross Domestic Product (GDP) by 2060, as shown by the graphic below, but China's percentage of world GDP (28%) will remain static between 2030 and 2060. Despite the rapid growth in emerging economies, significant differences in living standards between poor and rich countries will persist through 2060 (Johansson, et al., 2012, p. 8).





**Figure 8: Percentage of global GDP in 2005 Purchasing Parity Power**

*(Johansson, et al., 2012, p. 23)*

The second study, from the investment firm PwC, reached similar conclusions as it looked to 2050, finding that the global economy would more than double, largely propelled by emerging markets. It forecasts Mexico's economy to exceed Japan's, and India to exceed the combined economies of the European Union and Britain. Like the OECD study, it finds that this growth will not come automatically: Emerging markets need diversification, better institutions, and structural reforms to improve overall economic stability and achieve this potential growth. The figure to the right shows just how much relative economic power these emerging market states are projected to gain (PriceWaterhouseCoopers, 2017, p. 3). Both studies suggest that the global economic environment will facilitate growth for the countries and territories that compose the SOUTHCOR AOR, but this growth will be unevenly distributed between emerging economies as a function of resources, governance and policy.

**Emerging markets will dominate the world's top 10 economies in 2050 (GDP at PPPs)**

	2016	2050	
China	1	1	China
US	2	2	India
India	3	3	US
Japan	4	4	Indonesia
Germany	5	5	Brazil
Russia	6	6	Russia
Brazil	7	7	Mexico
Indonesia	8	8	Japan
UK	9	9	Germany
France	10	10	UK

 E7 economies 
  G7 economies

**Figure 9: Comparative Ranking of World's Top 10 Economies in 2016 and 2050**  
(PriceWaterhouseCoopers, 2017, p. 4)

Descending from the global economic level, several studies examine regional economics, reaching broadly similar conclusions about obstacles to future growth and their solutions. First, the IMF provides a detailed but relatively near-term regional baseline that forecasts regional growth at 2.6% annually. To address the limiting factors of this modest growth in the longer term, it proposes better infrastructure, increased female work-force participation, human capital investments, and an improved business environment characterized by better governance and less corruption (International Monetary Fund, 2017, pp. 26-28). Second, the annual Latin American and Caribbean Macroeconomic report gives little in the way of forecasts, focusing almost entirely on optimizing monetary, fiscal, trade, and tax policies as a mechanism to improve the region's overall growth (Powell, 2017).

Third, the ECLAC examines the implementation of the UN's 2030 Agenda for Sustainable Development in the region. Although not a forecast per se, the economic and policy challenges that it examines illuminate significant social and economic inequality between populations

(Economic Commission for Latin America and the Caribbean (ECLAC), 2016a). Fourth and finally, a study from CAF finds that the region, with increasingly mature institutions and abundant natural resources, is primed to follow the economic and social development model of Southeast Asia – if only it can implement certain growth-oriented policies (Corporación Andina de Fomento, 2010, pp. 5-15). The IMF, ECLAC and CAF reports all make recommendations that will be implemented by some states in the region, with varying levels of success towards the objective of economic growth. However, the states that currently have the worst of everything – institutions, crime, corruption, poverty – are not only starting behind the pack in implementing growth-oriented reforms, they also the least capable of doing so. Profound inequality will persist between states despite the many efforts to minimize it. This imbalance will increase emigrational pressure while also providing transnational threat networks permissive operating environments.

#### **4.2.4. Security trends and future scenarios**

The context of physical geography, demographics and economics broadly set the scene for more specific maritime security challenges and their potential solutions. For the most part, it is a positive context: Within the AOR, the physical environment will remain substantially the same, stable population growth will generally facilitate stability, and economic growth will selectively facilitate stronger institutions and states, which will both decrease threats in the maritime operating environment and increase the means to address them. Overall, these are positive long-term trends, particularly compared security trends in Eastern Europe, North Africa, the Levant, Southwest Asia and Southeast Asia. However, many challenges remain, and several of them impact U.S. security interests.

Global trends may set the context, but specific events capitalize on this environment to alter the course of history. Futurists start with these trends, but transition from science to art as they conduct extended thought experiments, evolving the iterative permutations of what might happen. Seven recent studies use this methodology to better understand what the future might hold and what can be done to direct it. As with the economic section above, the globally-focused studies place the regional studies into context.

The U.S. National Intelligence Council (NIC) has produced its *Global Trends* report every four years since 1997, and while they have not been specifically prophetic, past editions have anticipated significant events that conventional wisdom had dismissed as extremely unlikely (Burrows, 2016, pp. 2-4). The 2017 report, subtitled “Paradox of Progress”, describes the path to 2035 as having more danger and opportunity than ever before. It identifies seven global trends that drive the potential for both danger and opportunity, and then offers an analysis of their composite effect:

- The rich are aging, the poor are not.
- The global economy is shifting. [Weak sustained growth].
- Technology is accelerating progress but causing discontinuities.
- Ideas and Identities are driving a wave of exclusion.
- Governing is getting harder.
- The nature of conflict is changing.
- Climate change, environment, and health issues will demand attention.

These trends will converge at an unprecedented pace to make governing and cooperation harder and to change the nature of power—fundamentally altering the global landscape. Economic, technological and security trends, especially, will expand the number of states, organizations, and individuals able to act in consequential ways. Within states, political order will remain elusive and tensions high until societies and governments renegotiate their expectations of one another. Between states, the post-Cold War, unipolar moment has passed and the post-1945 rules based international order may be fading too. Some major powers and regional aggressors will seek to assert interests through force but will find results fleeting as they discover traditional, material forms of power less able to secure and sustain outcomes in a context of proliferating veto players. (National Intelligence Council, 2017, p. 6)

Over the next five years, the NIC forecasts rising tensions within and between states, as the U.S.-led world order splinters under the influence of an ever-increasing array of geopolitical actors. China and Russia will act with increasing boldness, as will certain regional powers.

Although these states will attempt to manipulate crises below the threshold for war, there will be a profound risk of miscalculation as states attempt to carve out and exercise spheres of influence. The forces of globalization will continue to propel unequal economic growth, which will in turn create disaffected populations, migrant flows and sharp nationalism. This unappealing future is not fixed, but turns on three crucial questions:

- How will national actors renegotiate their expectations and create new political order?
  - How will international actors craft new architectures of cooperation and competition?
  - How will various actors prepare for and cope with multifaceted global issues?
- (National Intelligence Council, 2017, pp. xi-x)

The NIC then develops three storylines – *Islands*, *Orbits* and *Communities* – each focused on national, regional, and transnational volatility, respectively, to explore how choices might interact with global trends to create different routes to the future.

- *Islands* considers a global economy with very low growth, and underscores the likely challenges faces by national governments to meet societal expectations for prosperity and physical security. This scenario highlights the difficult governmental task of finding new paths to growth against the populist pressure to revert to protectionism (2017, pp. 50-53).
- *Orbits* explores the international tensions, crises and war created by major and rising powers in their quest for spheres of influence, while also maintaining domestic stability (2017, pp. 54-57).
- *Communities* examines a future in which an ever-increasing cast of transnational actors outmaneuver inflexible national governments, mobilizing public opinion in support of their various agendas and undermining the power of states everywhere (2017, pp. 58-61).

From the global trends and scenarios, the NIC distills a more volatile future, prone to rapid change, and proposes that actors such as states and other institutions must nurture their future opportunities by building resilience. Citing the collapse of the Soviet Union and the Arab Spring, the NIC suggests that non-resilient states can be vulnerable to future shocks in ways that conventional metrics fail to capture (2017, pp. 65-69).

Burrows' *A Search for a New Normal* (2016) echoes many of the NIC's themes as it also looks ahead to 2035. Even the title indicates that the world is in the midst of a profound change, with potential for both positive and negative outcomes. It presents the post-Cold War international order in the process of fracturing, even as the internal political, social and economic structures of individual states come under increasing pressure. Drawing from the 2012 edition of *Global Trends*<sup>4</sup> and updating those the trends for recent events, it identifies four megatrends that manifest the breakdown of the international order:

- Conflict Risk at Highest Level since Cold War:
- No End in Sight of Middle East Instability
- China's Swing Role
- No Clear Path to Post-Western Order

Under the heading of "Unraveling at Home", it lays out four key domestic trends:

- Individual Empowerment: More Unintended Consequences
- Demographic Crunch
- Malthusian World for the Very Poorest
- Technology with Increasing Downside

*A Search for a New Normal* presents three alternative worlds focused on international order, and two that explore the implications for societal trends with a national and transnational emphasis:

- Fragmented World is the base case scenario, and forecasts an increasingly nativist and protectionist future in which globalization slows and multilateralism decays as each state retreats into its own narrow interests.
- New Cold War is a development of the Fragmented World, and forecasts segmented international blocks rising – and ultimately clashing – in response to Western isolationism.

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<sup>4</sup> Burrows contributed to the 2012 edition of *Global Trends*, but wrote *A Search for a New Normal* for the Atlantic Council as an independent effort.

- Strange Bedfellows sees states unite against criminal and terrorist groups armed with cyber and bioweapons. It casts a future in which security, rather than economic growth, becomes the dominant consideration for all governments.
- Ageless World examines future societies in which life expectancies rapidly rise past ninety years.
- Urban Oasis foresees megacities becoming increasingly influential, even beyond national borders.

These scenarios also suggest those of Global Trends, adding credibility to the basic idea of a more fragmented future (*Burrows, 2016*).

The U.K. MoD recently published two futures studies: *Strategic Trends* (2014) looks broadly out to 2045, focusing on the global security trends at large, while *Future Operating Environment 2035* (2015) summarizes these trends and their more specific impact on the character of conflict. Together, these studies see many of the same trends and issues addressed by the other two studies already presented, though with a notably greater emphasis on the impact of climate change on the long-term security environment. It also provides a concise forecast for the region:

Latin America and the Caribbean are likely to remain politically and economically fragmented, with individual countries pursuing bilateral relationships rather than forming a strong unified bloc. Brazil and Mexico are likely to show the strongest growth in the region, with both countries likely to be major global economies (in terms of GDP) by 2045. Rising sea levels and extreme rainfall are likely to expose a number of large and populous cities in coastal regions around South America to additional flooding risk. Socially, weak governance is likely to continue to inhibit progress in a number of countries, with the growing consumer class being increasingly vocal in its challenge to regimes. Some Latin American countries are highly likely to have mature military-industrial complexes and armed forces capable of performing on the global stage by 2045. Regional stability is highly likely to endure, although producing and globally distributing narcotics will almost certainly



continue, with an increasing ‘home market’. However, the emergence of a fully-fledged narco-state is unlikely. (U.K. Ministry of Defence, 2014, p. 109)

Two other studies look specifically at Latin America and the Caribbean futures, but develop the futures scenarios, and their security implications, into development policy recommendations for the region. First, *Latin America and the Caribbean 2030: Future Scenarios*, (Marczak & Engelke, 2016) jointly published by the IADB and the Atlantic Council, develops five scenarios: Muddling Through, Governance on the Rise, Illicit World Afloat, Toward Integration and Fragmentation Prevails.

Second, Bitar’s *Why and How Latin America Should Think About the Future* (2016) also develops other futures studies into policy recommendations, but furthermore advocates for greater integration of strategic planning and futures studies with regional governments. Both of the studies focused on Latin America and the Caribbean provide interesting insights, but their specific foci on economic, trade and governmental policies, rather than security, limits their utility for this study.

In contrast, the Marines Corps Security Environment Forecast develops its analysis with an unrelenting warfighting focus, (USMC Futures Directorate, 2015) similar to the U.K. *Future Operating Environment* (2015) in its approach. It echoes many of the same themes of the *Global Trends*. However, it lacks a specific section on security trend implications for Latin America and the Caribbean.

The NIC study remains the gold standard for other futures studies, which develop the implications of its global trends in specific areas. Its regional security forecast provides an excellent conclusion to this part of the subchapter:

Although state weakness and drug trafficking have and will continue to beset Central America, South America has been more stable than most regions of the world and has had many democratic advances—including recovery from populist waves from the right and the left. However, government efforts to provide greater economic and social stability are running up against budget and debt constraints. Weakened

international demand for commodities has slowed growth. The expectations associated with new entrants to the middle class will strain public coffers, fuel political discontent, and possibly jeopardize the region's significant progress against poverty and inequality. Activist civil society organizations are likely to fuel social tensions by increasing awareness of elite corruption, inadequate infrastructure, and mismanagement. Some incumbents facing possible rejection by their publics are seeking to protect their power, which could lead to a period of intense political competition and democratic backsliding in some countries. Violence is particularly rampant in northern Central America, as gangs and organized criminal groups have undermined basic governance by regimes that lack capacity to provide many basic public goods and services.

- Outlook: Central and South America are likely to see more frequent changes in governments that are mismanaging the economy and beleaguered by widespread corruption. Leftist administrations already have lost power in places like Argentina, Guatemala, and Peru and are on the defensive in Venezuela, although new leaders will not have much time to show they can improve conditions. The success or failure of Mexico's high-profile reforms might affect the willingness of other countries in the region to take similar political risks may be an opportunity—and incentive—for some countries to improve economic policies in a region with fairly balanced age demographics, significant energy resources, and well-established economic links to Asia, Europe, and the United States. (National Intelligence Council, 2017, p. 33)

#### **4.2.5. Missions and capacities suggested by regional security trends**

This subchapter has shown the likelihood of uneven progress throughout the world and throughout the SOUTHCOM AOR. Due to geographic proximity, security challenges and weak institutions, Central America and the Caribbean will continue to have a disproportionate impact on U.S. maritime security interests, as compared to the rest of the AOR. Currently, the countries within these sub-regions have an exceptionally wide range of security challenges, institutional stability, and per capita incomes. Haiti ranked with Iraq and Afghanistan in the “High Alert” category of the Fragile States Index, whereas Costa Rica and Barbados shared the “More Stable”

category with the Poland, the Baltic States, Chile and Argentina (Fund For Peace, 2017, pp. 6-7). Many states within the region will maintain their own maritime security within their areas of responsibility, cooperate with other states for securing the high seas, and serve as net exporters of security. Other states will be incapable of policing their territorial seas. The projection for uneven economic, social and institutional development portends a future in which natural disasters will continue to wrack vulnerable populations and in which transnational threat networks will continue to target and exploit weak institutions in a variety of illegal pursuits. This situation impacts U.S. security interests; therefore, the U.S. role in the region will continue. Preventing and addressing these problems are not primarily naval missions: Other government agencies, together with various non-governmental organizations and intergovernmental organizations, form the core effort. Nevertheless, naval forces support these efforts in critical ways: through security cooperation and building partner capacity; through maritime domain awareness and presence; and through rapid, expeditionary logistics. These familiar mission sets will continue by virtue of the persistent challenges in the maritime security environment. Central America and the Caribbean will continue to have special importance owing to geographic proximity, the importance of the Panama Canal, and the security situation in this region relative to the rest of the AOR.

South America has a broader and more abstract importance to U.S. policy. The NIC found that “although material strength will remain essential to geopolitical and state power, the most powerful actors of the future will draw on networks, relationships, and information to compete and cooperate. This is the lesson of great power politics in the 1900s” (2017, p. ix). The fracturing international order anticipated by these studies will alter the geopolitical landscape, and with it, the strategic motivations for current naval missions and operations. Transnational threat networks will continue to be important, as their root causes remain essentially unchanged. However, with the rising power of China, India, Mexico, Brazil and others, and the declining relative power of the U.S., the importance of partnering with democratic states that share common interests and common values will only increase. The countries in the Western Hemisphere, Western Europe and the British Commonwealth share much in terms of democratic politics, culture, and language, leading to many shared interests and potential partnerships on the global stage.

U.S. policy toward the rest of the Western Hemisphere since the Monroe Doctrine has meandered between principled idealism and hegemonic realpolitik. In light of this long and

complicated legacy, certain states within the region will likely remain cautious of complete rapprochement. On the other hand, states often act according to their interests and not their grudges, no matter how valid those grudges may be: Witness the current U.S. relationship with Vietnam, little more than 40 years after the end of a mutually ruinous war (White House Press Secretary, 2016). Improving such a bilateral relationship takes time, often a generation or more, and effort. The naval component of that diplomatic effort may take many forms – port calls, exercises, exchange programs, training, humanitarian aid, security assistance – but most of these forms either require or are enhanced by the presence of a ship. Naval presence operations should find common ground that contributes to both state's larger objectives. For example, a small, coastal navy with a few patrol boats would be far better served by a training assistance visit focused on diesel engine maintenance and repair than by combined operations with a U.S. aircraft carrier. In addition to their many other missions, future naval platforms designed for the SOUTHCOM AOR must be capable in facilitating partnerships with other navies in the region at their level of operations.

### **4.3. Planned and Possible U.S. Fleet Architectures**

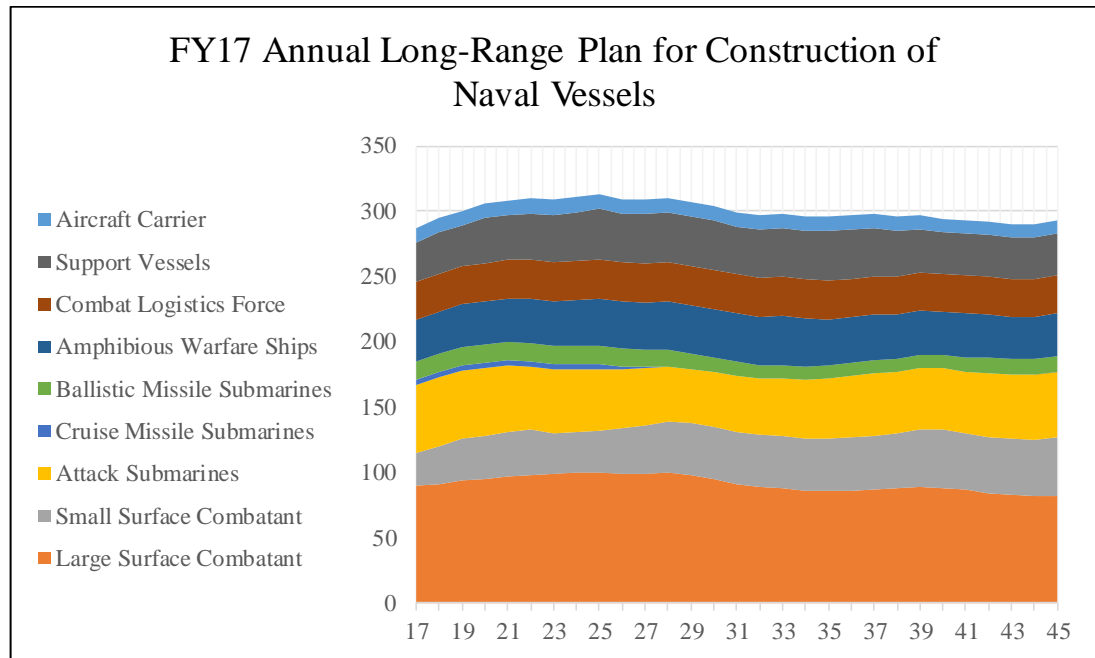
This subchapter examines the range of possibilities for U.S. naval forces out to 2045. The USN's 30 year shipbuilding plan provides a baseline for what is currently planned through 2046; the reports from CSBA, MITRE, and the Navy Project Team provide alternative visions for fleet design; and the latest FSA summary, which projects significant growth from the current plan, provides a preview of the next shipbuilding plan. Two of the alternative fleet design studies only forecast through 2030, but implementing any of the proposals would impact the fleet composition in 2045, both through the ships built before 2030 and through the trends in ship classes and operating concepts continuing after 2030. In summarizing the current plan, studies and FSA, this subchapter will focus on vessel classes that would provide utility in the projected SOUTHCOM security environment, such as frigates, patrol craft, transports and amphibious shipping, over important but less relevant ships, such as ballistic missile submarines.

#### **4.3.1.Fiscal Year 2017 (FY17) Shipbuilding Plan**

The USN submitted the FY17 Annual Long-Range Plan for Construction of Naval Vessels to Congress in July 2016, scheduling the next 30 years of ship construction. That plan reflected the then-current 2014 update to the 2012 FSA, a classified document that stated a requirement for 308 ships based on national strategy, expected naval missions, and threat assessment. The shipbuilding plan projects a year-by-year, platform-by-platform construction schedule of naval vessels through 2046. The FY17 fleet includes 287 ships, a number that would grow moderately, peaking at 313 ships in 2025 before gradually declining to 292 by 2046, and averaging 300 ships. To achieve and maintain such a fleet, the plan calls for the construction of 254 new ships across eight broad categories (OPNAV N8, 2016).

The plan projects generally stable ratios between ships categories over the next 30 years. The most dramatic changes are in the percentage of small surface combatants (SSCs), rising from 8.7% of the fleet in 2017 to 15.4% in 2046, followed by the disappearance of the SSGN class, (1.4% in 2017, extinct by 2028), and the moderate reduction in the percentage of large surface combatants (LSCs) (31.4% to 27.4%) (OPNAV N8, 2016). The overall force ratios have changed rather little in the 67 years since President Truman's NSC-68 doctrine "articulated the need for 12 aircraft carriers, 100 attack submarines, and amphibious lift for 39,000 troops" in 1950 (MITRE

Corporation, 2016, p. 12). Whether these persistent category ratios are a historical artifact, a proven formula, or an appropriate prescription for the next 30 years remains very much the focus of every successive FSA and each fleet architecture study.



**Figure 10: FY17 Annual Long-Range Plan for Construction of Naval Vessels**

#### 4.3.2. 2016 Force Structure Review

In December 2016, the USN released an unclassified executive summary of the new FSA, which described an increased requirement for a 355 ship fleet (U.S. Navy, 2016). Although the FY18 shipbuilding plan has not been released, one can analogously project some characteristics from the relationship between the previous FSA and the shipbuilding plan that followed. First, just as the shipbuilding plan based on the 308 ship FSA only met or exceeded that threshold for 8 years out of 30, and averaged 300 ships, the 355 ship plan will likely average a figure short of the assessed fleet requirement, particularly if the major recapitalization of the ballistic missile submarine program (slated for FY2021 through FY2035) is funded through the normal shipbuilding budget, thereby diminishing available funding for other hulls (O'Rourke, 2017a). Second, extrapolating the FSA requirements to the next shipbuilding plan would result in the construction of approximately 76 additional ships: 4 aircraft carriers, 24 to 25 LSCs, 10 SSCs, 16

to 19 attack submarines, 7 amphibious warfare ships, and 12 combat logistics ships/support vessels (constructing 328 to 330 ships overall, vice 254)<sup>5</sup> (Congressional Budget Office, 2017, p. 2). Despite the changes in size, the ship category ratios in the 2016 FSA are practically identical to the ratios of the fleet in 2045, as forecast by the current (FY17) shipbuilding plan, with a difference of less than 2% in each ship category. The entire fleet is simply scaled up.

It should be noted that the Congressional Budget Office questioned the feasibility of the fleet required by the new FSA, stating that, “over the next 30 years, meeting the 355-ship objective would cost the Navy an average of about \$26.6 billion (in 2017 dollars) annually for ship construction, which is more than 60 percent above the average amount the Congress has appropriated for that purpose over the past 30 years and 40 percent more than the amount appropriated for 2016” (Congressional Budget Office, 2017, p. 1).

#### **4.3.3. Origin of the Fleet Design Studies**

Making significant changes from a fleet architecture formula that worked successfully through the Cold War, and the almost 30 years since then, requires determination to overcome institutional inertia, careful planning to get the fleet design right, and agility to recover from mistakes and adapt to changing requirements. The return to great-power competition, as highlighted in the 2017 Defense Posture Statement, along with the proliferation of increasingly credible A2AD threats, have given the impetus to reevaluate the overall fleet structure (Sobeck, 2017).

The 2016 National Defense Authorization Act commissioned three independent studies to analyze USN alternative future fleet platform architectures in the 2030 timeframe, taking into account the following factors:

- Security environment
- National Security Strategy
- Traditional and alternative roles of U.S. naval forces,

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<sup>5</sup> The requirement for small surface combatants remains stagnant at 52 hulls between the two FSAs. The 10 additional ships are a function of matching the next shipbuilding plan to the stated requirement, which the FY17 shipbuilding plan did not do.

- Other U.S. armed forces,
- Role of evolving technology (including unmanned systems)
- Opportunities for reduced costs. (114th U.S. Congress, 2015, p. SEC. 1067)

The specific study results were to include “the numbers, kinds, and sizes of vessels, the numbers and types of associated manned and unmanned vehicles, and the basic capabilities of each of those platforms,” (114th U.S. Congress, 2015, p. SEC. 1067) along with necessary contextual information, deviations from the current plan, and the implications for naval aviation.

The three alternative studies share much in common, given that they all received the same mandate at the same time. The problem-framing section of each study demonstrates a consistent appreciation for the challenges posed by the new strategic environment, differing principally in length and detail. While each study calls for a larger fleet to deal with growing threats, each one acknowledges the fiscal impossibility of simply scaling up the current fleet. They also agree that the current concept of operations, largely focused on the Carrier Strike Group (CSG), entails excessive risk in a changing threat environment, and that maintaining maritime superiority requires revamping this concept of operations. Each study proposes growing the fleet while limiting costs through the acquisition of various low end platforms while making focused investments in high end capabilities. Each calls for greater integration of unmanned systems, and for studying the acquisition of a light aircraft carrier (CVL). They diverge in the degree to which they embrace unmanned platforms, their reliance on other revolutionary technologies (such as electromagnetic rail guns), in their specific operational concepts and the associated new or modified platforms.

#### **4.3.4. Navy Project Team**

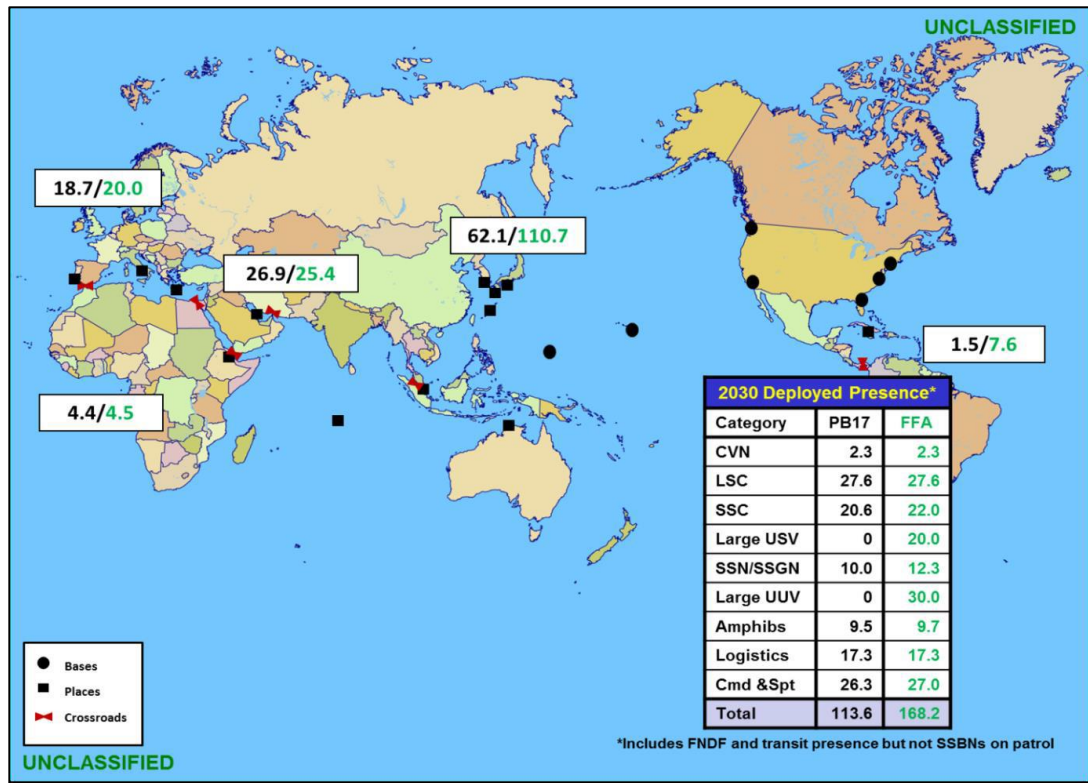
The Navy Project Team, led by the CNO’s Assessment Division (OPNAV N81), envisions a “Distributed Fleet” of 321 manned ships and 136 large unmanned vehicles (both surface and subsurface) as a “widely dispersed, expansively networked set of air, surface, and sub-surface platforms capable of delivering both kinetic and non-kinetic effects and supported by survivable logistics” (2016, pp. 3-4). The study strongly echoes the decentralized concept of distributed lethality, proposed in 2015 by surface navy leadership as a response to increasing A2AD threats



(Rowden, Gumataotao, & Fanta, 2015). However, the study also confronts the second-order challenges created by such a distributed fleet, addressing the need for assured communications (Fox, 2016) through electromagnetic maneuver warfare, and “sustaining combat operations in a contested environment” (Navy Project Team, 2016, p. 10) through distributed agile logistics. Compared with the existing fleet plan, the Navy study calls for significant increases in forward-deployed naval forces and unmanned platforms, a moderate increase in the fleet size, and a significant decrease in the number of manned aircraft. The study proposes acquiring many large unmanned vehicles to replace or augment manned craft in contested waters: 88 Large Unmanned Surface Vehicles (USV) based on the MK-VI special operations craft of 72 tons displacement, and 48 Large Unmanned Underwater Vehicle (UUV) of 90 tons submerged displacement. It also changes the concept of operations and the acquisition priorities for several manned platforms to enable unmanned capabilities: using amphibious ships with well decks to launch and recover large USVs, purchasing 12 additional Virginia Class submarines with UUV-capable payload modules, and reducing manned aircraft to pay for the other changes (Navy Project Team, 2016).

The study calls for a number of platform innovations beyond unmanned vehicles, such as a CVL based on the current LHA, and a DDGH, based on the current *Burke*-class destroyer but with extra aviation capability at the cost of its aft Vertical Launch System (VLS) cells. It also proposes a new modular platform, the Common Hull Auxiliary Multi-mission Platform (CHAMP), to support unmanned platforms and replace dedicated command ships and submarine tenders (AS).

The study forecasts that its proposals would increase global forward presence, including within the SOUTHCOM AOR, as shown below:



**Figure 11: Notional forward presence in 2030, Planned vs. Distributed Fleet**

*(Navy Project Team, 2016, p. 12)*

It should be noted that virtually all of the increases in presence shown in the figure above would come from large unmanned vehicles, both surface and subsurface. Some missions within the SOUTHCOM AOR, such as surveillance, could certainly benefit from these unmanned platforms, particularly missions that are currently under-resourced. Many other missions, including maritime interdiction, humanitarian aid, and building partner capacity, however, are better accomplished by manned vessels. With this in mind, configuring the large USVs as optionally manned would make them more flexible and able to satisfy a wider range of missions.

Relative to the planned fleet of 2030, the Navy study proposes an increase in SSCs and slight decreases in LSCs, amphibious shipping, and expeditionary transports. The impact of this changed fleet architecture would hinge on the implementation of unmanned systems, since several categories of manned surface platforms currently in demand for SOUTHCOM would shrink. The

table that follows the summary of the MITRE study provides details for each ship category, broken down by study.

#### 4.3.5. CSBA

The CSBA study orients its fleet architecture with a revised fleet operating concept, dividing the deployed fleet into “ ‘Deterrence Forces’ that are organized into discrete regions rather than Combatant Commander (CCDR) areas of responsibility (AOR), and a ‘Maneuver Force’ that is assigned broadly to the Indo–Asia–Pacific theater and composed of the carrier strike groups (CSG) deployed today in the Central and Pacific CCDR AORs” (Clark, et al., 2017, pp. iii-iv). This revised naval posture departs from the one-size-fits-all model of carrier strike groups and amphibious ready groups. The deterrence forces would be smaller and more widely distributed than current surface forces but still have enough firepower and magazine capacity to fight the opening days of a major naval engagement. The maneuver group would then relieve the deterrence force, bringing the sustained, medium-intensity firepower of carrier aviation to bear. The proposed operating concept emphasizes posture over presence, measured by the “overall capability to conduct and sustain combat operations” (Clark, et al., 2017, p. iv) rather than the mere number of ships in a particular theater.

The CSBA operating concept leads to a greater tailoring of task groups to accomplish the most likely missions within their respective AORs, a concept that includes the long-term pairing of specific units with specific regions in order to build local expertise. It proposes the following new or modified task groups, and then builds a force architecture to suit:

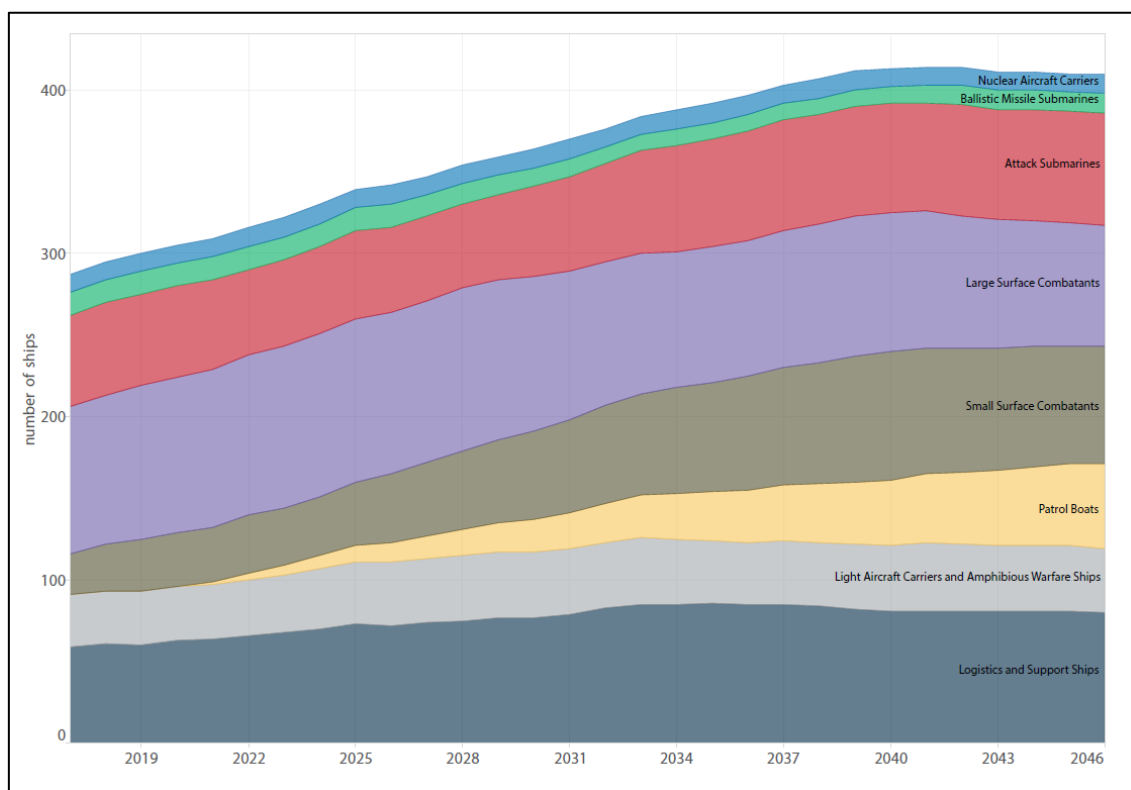
- **Carrier Strike Groups**, composed of a nuclear aircraft carrier (CVN) with embarked airwing (CVW), two DDGs, and two FFGs.
- **Counter-ISR (intelligence, surveillance, and reconnaissance) Groups**, composed of an FFG, Medium Altitude, Long Endurance (MALE) UAV and several USVs.
- **Anti-Submarine Warfare (ASW) Groups**, composed of an FFG, ocean surveillance ship (T-AGOS) and a UUV, each with active and/or passive sensors, and supported by a MALE UAV and two P-8As.

- **Offensive Mine Warfare Groups**, composed of an FFG and 2-3 Extra Large UUVs (XLUUV).
- **Surface Action Group (SAG)**, composed of a DDG, 2 FFGs, embarked helicopters, MALE UAVs, and two XLUUVs for targeting.
- **Littoral Combat Group**, composed of an air defense FFG, three MALE UAVs, and three patrol vessels with anti-ship/strike missiles.
- **Amphibious Ready Group**, composed of a CVL or LHA/LHD, one LPD and two LX(R)s, (the LSD replacement).
- **Unmanned Vehicle Squadron**, consisting of one support vessel and a mix of aerial, surface and subsurface vehicles to support a wide range of missions.
- **Crisis Response Groups**, composed of one FFG and one small deck amphibious ship (LPD or LX(R)), with manned and unmanned aerial platforms, and ship-to-shore connectors.
- **Mine Countermeasures (MCM) Groups**, essentially a specialized Unmanned Vehicle Squadron. (Clark, et al., 2017, pp. v-vi)

The Navy study imagines a future fleet that was too dispersed and lethal to ever be challenged, mortgaging manned naval aviation to pay for it; the CSBA study finds that such a dispersed, lethal fleet would still lack the weapons capacity (especially in missiles) to finish a fight in a contested environment. The CSBA study proposes the maneuver force as the answer, backing up the deterrence force (Clark, et al., 2017, p. 43). Like the other studies, it recommends new classes of ships to achieve its operational concept. It proposes the acquisition of 42 patrol vessels similar to the VT Halpern-Marine *Ambassador Mk III*-class fast missile craft or Swedish *Visby*-class: 600-700 ton patrol vessels with about 2 weeks endurance, 4-8 SUW/strike missiles and basic air self-defense capabilities (Clark, et al., 2017, pp. 79, 117). It also proposes rapid growth in SSCs, setting a requirement for 71, aside from the patrol vessels. The unmanned platforms it proposes are larger and more capable, but fewer, than those in the Navy study.

The North and South America Deterrence Force described by the study consists of a continuous (1.0) operational presence in the Eastern Pacific, provided by a frigate based in the continental U.S. (CONUS), and patrol ships in the Caribbean with 1.7 operational presence. The study emphasizes that surge security and disaster response forces would be readily available from CONUS to buttress this presence as needed (Clark, et al., 2017, pp. 50-51).

Unlike the other two studies, the CSBA study provides long-term fleet requirements, similar to the FSA, along with a detailed, category by category forecast all the way to 2046, similar to the shipbuilding plan. Compared to the planned fleet of 2045, it requires a large increase in SSCs and patrol craft, a moderate decrease for LSCs, and a moderate increase for amphibious shipping (when including the LHA/LHDs recategorized as CVLs). The study does not break out numbers for expeditionary transports. The graphic below summarizes the CSBA proposed fleet through 2046:



**Figure 12: Battle Force Inventory Resulting from the CSBA Shipbuilding Plan**

(Clark, et al., 2017, p. 115)

#### 4.3.6. MITRE

The MITRE study frames the fundamental problem as the modern missile threat: long-range Anti-Ship Ballistic Missiles (ASBM), Anti-Ship Cruise Missiles (ASCM), and the long-range, persistent targeting that facilitates their use. (MITRE Corporation, 2016, pp. 16-17) To overcome this challenge, it focuses on layered, multi-tiered Integrated Air Missile Defense (IAMD) to defend the fleet, and long-range power projection to hold the enemy at risk with precision fires (2016, p. 19). The MITRE study then uses three guiding principles to balance its implementation of this counter-A2AD strategy. First, increase effectiveness, by adapting new sensors, weapons, and command, control, and communications (C3) systems to existing platforms, rather than developing and acquiring new ones. Second, improve affordability.<sup>6</sup> Finally, and directly related to the affordability criterion, increase capacity (MITRE Corporation, 2016, p. 25). Each of its eight primary recommendations for increasing effectiveness and/or increasing capacity seeks to avoid, mitigate or counter the enemy missile threat; the remaining four recommendations that only reduce costs are meant to pay for the primary recommendations. See the table below:

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<sup>6</sup> Elsewhere in the study, “Reduce Cost”.

Recommendation	Increase Effectiveness	Reduce Cost	Increase Capacity
1. Immediately cancel the Littoral Combat Ship (LCS) productions.		✓	
2. Procure an additional DDG-51 per year, using funds available from LCS termination, until a new frigate for Integrated Air Missile Defense (IAMD) is under construction.	✓		
3. Augment existing CG-47s and DDG-51s with a magazine ship to increase weapon capacity and provide a long-range strike capability to the surface force.	✓		✓
4. Fix the naval aviation shortfall by deferring or reducing the F-35C procurement for additional F/A-18 E/Fs.			✓
5. Develop an aerial layer for Integrated Air Missile Defense (IAMD) that is integrated with the corresponding IAMD platforms in the surface force.	✓		
6. Delay the <i>Ford</i> class CVN procurement to align with the number of CVWs.		✓	
7. Modify the <i>Ford</i> design or develop a conventional alternative to reduce cost to less than \$11 billion.		✓	
8. Continue <i>America</i> class amphibious assault ship procurement but consider a small carrier option, with catapults for fixed-wing flight operations, as a potential alternative in the late 2020s	✓		
9. Do not procure any more <i>San Antonio</i> class LPDs beyond what is planned		✓	
10. Consider some near-term alternatives to the current plans for the LXR class of ships to support disaggregated expeditionary operations.		✓	✓
11. Continue to build two <i>Virginia</i> class SSNs per year, each with VPMs after 2019.	✓		✓
12. License and produce diesel submarines as lower cost platform to augment the SSN force.		✓	✓

**Table 1: MITRE Study Summary of Recommendations**  
for the 15 Year Shipbuilding Plan (MITRE Corporation, 2016, p. 4)

According to MITRE, “The tradeoffs embedded within these recommendations are: 1) additional large surface combatants (LSCs) at the expense of small surface combatants (SSCs); 2)

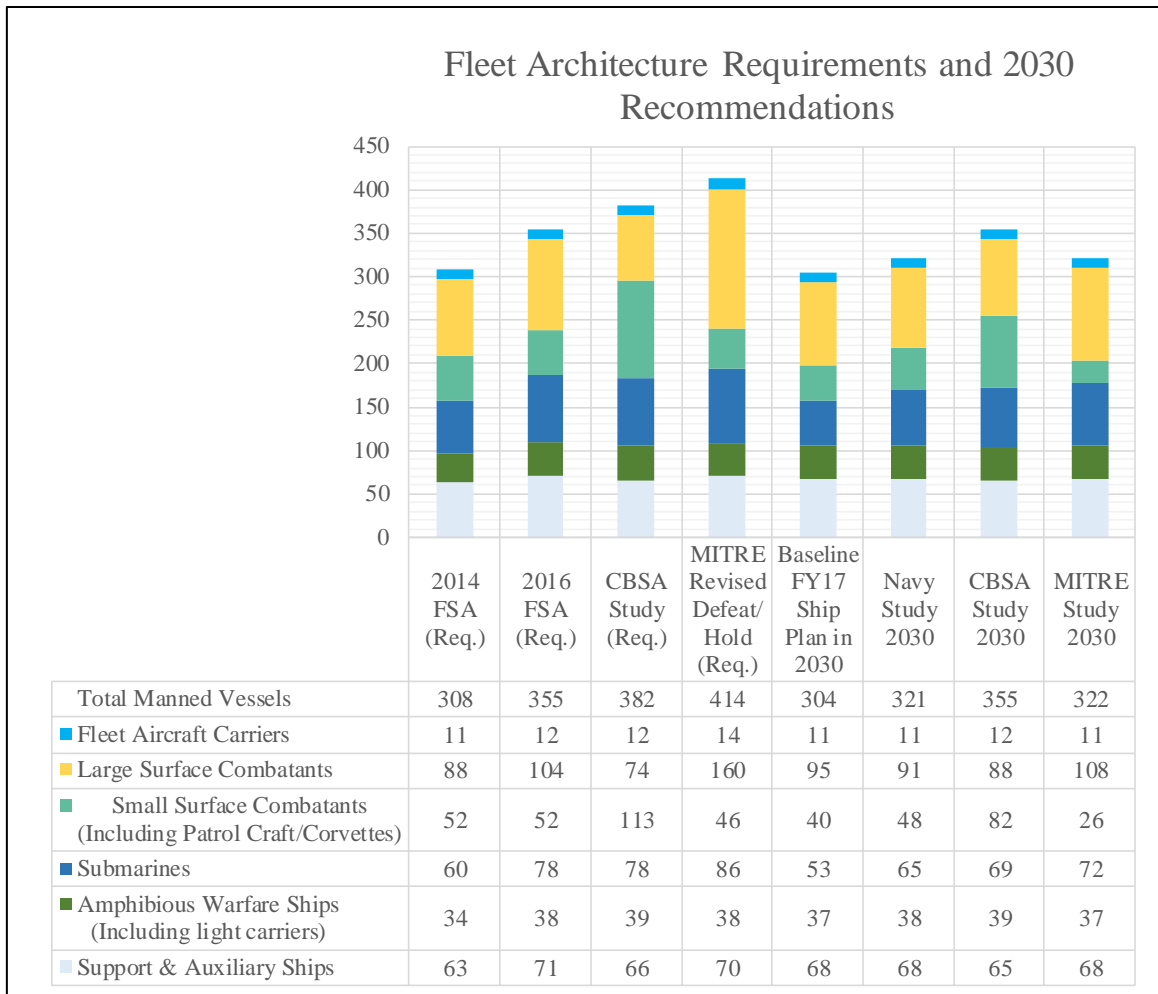
more attack submarines (SS); and 3) introduce lower cost ship concepts to pay for increased SS production” (2016, p. 5). Regarding new platforms, it proposes a magazine ship, with up to 1,024 Vertical Launch System (VLS) cells, to supplement the limited missile capacity of current cruisers and destroyers. This magazine ship would include defensive surface to air missiles, cruise missiles and offensive long-range tactical ballistic missiles – one part of the long-range power projection mentioned in the counter-A2AD strategy (MITRE Corporation, 2016, pp. 31-32). The study also proposes the re-acquisition of diesel electric submarines to quickly and cheaply grow the submarine fleet (MITRE Corporation, 2016, pp. 44-45). Although not formalized in its proposed ship buying plan, the study recommends an exploration of alternatives to the LXR (the LSD replacement) that could result in the acquisition of 6-8 Fast Expeditionary Transports (EPFs) or 2-4 modified Large, Medium Speed Roll-On/Roll-Off (LMSR) for every LXR not purchased (MITRE Corporation, 2016, p. 49).

As compared to the fleet in 2030, as projected by the FY17 shipbuilding plan, these recommendations would result in 13 additional LSCs, 14 fewer SSCs, and 19 additional attack submarines, while leaving other ship categories essentially unchanged (MITRE Corporation, 2016, p. 55). More than the other two studies, MITRE focuses on fighting and winning a fight against a threat like China, almost to the exclusion of other naval missions, and then builds a fleet around its solution. This fleet structure, filling out its low-end ships with conventional submarines and magazine ships rather than frigates or patrol craft, would provide limited platforms for future SOUTHCOM missions. The LXR alternatives, if acquired, could offset this lack of suitable platforms.

#### **4.3.7. Comparison of alternative fleet design study recommendations**

To better compare the fleet architectures proposed by the studies, the table below summarizes (from left to right) the force requirements from the 2014 and 2016 FSAs, the CSBA force structure objective, the MITRE Revised Defeat/Hold Scenario requirement (not the final recommendation), and four snapshots of the fleet in 2030: as currently planned, per the Navy Team’s study, the CSBA study, and the MITRE study.





**Figure 13: Fleet Architecture Requirements and 2030 Recommendations<sup>7</sup>**

Each study introduces a low-cost alternative to grow and disperse the fleet. The Navy study proposes a large growth in unmanned systems; the CSBA study proposes more patrol craft and frigates; the MITRE study proposes conventional submarines and magazine ships. Many of the other differences, such as the numbers of nuclear aircraft carriers or attack submarines, are not as relevant to the question of future U.S. naval capabilities within the SOUTHCOM AOR, as these

<sup>7</sup> Note: The MITRE Revised Defeat/Hold Scenario is not the studies's final recommendation. It is MITRE's preliminary FSA, establishing the fleet architecture requirement for defeating an enemy in one theater and holding another enemy elsewhere with current operating concepts. The 2030 CSBA and MITRE figures are inferred from various tables and text from the respective studies; the Navy figures are directly reproduced.

vessels typically deploy elsewhere. Of the three studies, the fleet architecture, platforms and operating concepts described by the CSBA study appears to best satisfy the future naval missions of SOUTHCOM: The large numbers of frigates and patrol vessels it proposes would likely permit a sufficient number to be assigned to the SOUTHCOM AOR.

#### **4.3.8. The Future Navy**

The CNO recently released a whitepaper entitled *The Future Navy* (Richardson, 2017) that briefly surveys the fleet architecture studies and synthesizes their conclusions with his own guidance. His direction and guidance, quoted and elaborated in the paragraphs below, orients the next subchapter of analysis and recommendations.

“One [conclusion] is that numbers matter. The number of ships in the Navy’s fleet determines where we can be, and being there is a key to naval power” (2017, p. 4). Numbers matter, and affordable ships make for a numerous fleet. With that in mind, the vessels proposed later in this study should prioritize affordability as facilitated by low technology risk and stable performance requirements in the design phase, and a long, steady acquisition phase characterized by predictable production lines, competing shipyards and modest, evolutionary changes.

“Generally speaking, most analyses take an evolutionary approach that would seek to expand the current Navy much as it is, using current operating concepts, platforms, and modestly incorporating technological upgrades as they unfold” (2017, p. 4). In the underwhelming wake of revolutionary shipbuilding efforts like the *Zumwalt*-class and Littoral Combat Ship (LCS) program, the CNO’s evolutionary approach towards operating concepts, technology and platforms has appeal. In the near term, modifying an existing design already in production at a U.S. shipyard, either for export or the Coast Guard, would implement this guidance to minimize cost and risk. Modest, evolutionary changes in later block buys could then further improve capability while containing costs.

“Mere numbers are not enough: what a platform can do - how capable it is to create an effect – is increasingly important” (2017, p. 4). Numbers are not enough, or put another way, capability matters. However, capability is harder to quantify counting hulls and ship types: What capabilities

are needed? How might these capabilities support a force that is more than just the sum of its parts? Designing for capability requires the context of the planned operational environment and likely missions. The platforms proposed in the next subchapter should both be able to conduct peacetime presence operations (Phase 0) and to support major fleet combat operations through niche roles (Phase I/II/III).

“The pace of change also demands that we design ships with modernization in mind. The “core” of those future ships ... will likely be built to last for decades. .... Future ships should be made for rapid improvement with modular weapons canisters and rapidly swappable electronic sensors and systems.” (2017, p. 6) The most important initial capability considerations are the basic, unchangeable characteristics of the sea-frame: the shape of the hull, the full load and light load displacements, the propulsion and auxiliary systems. Unlike mission systems or weapons, these factors are essentially fixed. These attributes also determine the capacity for future growth in terms of weight, space, access, and electrical power availability, which are critical for a ship designed with modernization in mind. Therefore, the vessels in the next subchapter should prioritize inherent growth potential, even if that means accepting moderate compromises in other areas such as speed.

“[We must] implement new ways of operating our battle fleet, which will comprise new types of ships. The clear conclusion is that linear expansion and improvement will not achieve the exponential pace that will enable us to win in the future” (2017, p. 4). In a recent interview concerning the future fleet, one of the CSBA study’s authors said “I’m relatively satisfied with the weapons, weapons programs, and sensors. What I am not satisfied with is the networking, the ISR, and the connective tissue among all the elements.” (McGrath, 2016) These quotes should orient the niche capabilities for future low-end platforms. The vessel capabilities should be conceptualized at two levels: around the vessel itself and around its support to naval operations. For its own survivability, a manned vessel should be able to move, shoot, sense and communicate within a contested environment. Optionally-manned vessels, which are comparatively more expendable in a high-threat environment, can accept lower capability thresholds in order to achieve greater numbers. At the operational level, the vessel must be able to contribute at least

one of the joint functions<sup>8</sup> to the rest of the fleet, as required by the operating concept. For example, a small ship with a basic self-defense suite could move, shoot, sense and communicate at a basic level. With a towed airborne communications relay, it could contribute to C3 within a communications degraded environment, enabling still other functions such as fires and intelligence.

“Future designs must aggressively go after ways to drive down the costs to operate and maintain the future fleet, no matter its composition” (Richardson, 2017, p. 6). Simpler ships with moderately smaller crews reduce life cycle operating costs. Manpower accounts for around 60% of operation and support costs for a surface combatant. Even the LCS’s originally planned 53-man crew still accounted for 44% of these costs (Congressional Budget Office, 2010, p. 7). This reduction of operation costs should not come at the cost of mission effectiveness or later corrective modifications to the ship, as was the case with the LCS program when the minimal crew was later found to be insufficient (LaGrone, Report: LCS Manning Could Permanently Increase by 2015, 2013).

The platform attributes of availability, affordability, capability, and flexibility, as distilled in the national security subchapter, find renewed expression in Admiral Richardson’s guidance: an affordable but larger, more capable, and more flexible fleet that evolves new operating concepts, platforms and technologies into mature capabilities of naval power.

#### **4.3.9. Recent developments**

The Navy’s July 10, 2017 request for information (RFI) delineated the initial design requirements for the new frigate that will replace the LCS. This document suggests a conventional frigate, with an advanced phased array radar, capable air defense missiles, organic ASW capabilities, and a threshold sustained speed of 28 knots, marking a departure from the LCS’s high-speed and modular approach. These 20 frigates will be acquired from 2020 until the early

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<sup>8</sup> Command and Control (C2), Intelligence, Fires, Movement and Manuever, Protection, and Sustainment.

2030s and remain in service at least through 2045 (NAVSEA, 2017b). Given the future security environment in SOUTHCOM, as discussed in previous subchapters, a platform more capable than the proposed frigate would more than likely find employment elsewhere. This investigation seeks to influence future acquisitions, as focused on SOUTHCOM; whereas the programmatic direction of the next frigate has lately been roughly established, an analysis of other platforms would better accomplish the objective of this investigation.

The Navy issued another RFI to industry on 23 May that described its desired extra-large USV capabilities. Threshold criteria included a 4,500 NM range, 30 days endurance, 27 knots top speed, redundant propulsion, good seakeeping (operating payloads in Sea State 5, surviving in Sea State 7), and 40,000 lb. of deck payload available for mission systems (NAVSEA, 2017a).

#### **4.4. Analysis and Recommendations**

##### **4.4.1. Summary of key findings**

The abiding security interests of the U.S. will remain essentially stable over the next 30 years. The geopolitical security environment in which the U.S. will pursue its interests, however, will change significantly. The post-Cold War order will fracture into a multi-polar world with increasingly capable competitors, and this process will bring with it increased risk for conflict. U.S. naval forces will be critical for managing this grand geopolitical shift. These forces must be designed for flexibility as facilitated by rapid integration of new technologies and continually evolving operational concepts. The scarcity of expensive high-capability units, particularly for low-priority missions, will force greater attention to the low end of the force structure, and more careful fitting of forces to missions.

SOUTHCOM, as an economy of force AOR, simply will not drive the acquisition process. The platforms proposed for SOUTHCOM must therefore support high-end naval operations in other regions and yet not be subject to such high demand as to render them unavailable during normal peacetime operations. In other words, they must be flexibly capable. They must also be affordable enough to buy in large quantities, because a small fleet under high operational demand will leave few platforms for SOUTHCOM. The guiding attributes for vessels conceived for the SOUTHCOM AOR are: flexible capability, affordability, and availability.

#### **4.4.2. SOUTHCOM mission requirements and platform implications**

Within the SOUTHCOM AOR, the Caribbean and Central American sub-regions represent the most frequent location for the employment of U.S. naval forces. The distances and meteorology within the Caribbean basin permit the use of relatively small vessels. The geography of U.S. basing also means that joint forces can quickly surge to crisis areas, as in the aftermath of the 2010 Haiti earthquake, a capability that in other AORs requires extensive forward-deployed forces. Current missions include: Maritime Domain Awareness (MDA), Maritime Interdiction Operations (MIO), Security Assistance (SA), training, and Humanitarian Assistance/Disaster Relief (HA/DR); these missions will likely continue into the future. The very limited risk of interstate/high-intensity conflict within the SOUTHCOM AOR means that civilian-crewed naval vessels built to commercial standards can efficiently contribute to Phase 0 operations, as the EPF does currently.

#### **4.4.3. Other AOR mission requirements and platform implications**

Future vessels intended for SOUTHCOM must be capable of supporting fleet operations outside of SOUTHCOM. To do so, they must first navigate across the Atlantic or Pacific, requiring at least a marginal self-deployment capability. Enemy capabilities seek to challenge the friendly operational functions of command and control (C2), protection, and fires in order to deny movement and maneuver in contested areas. Therefore, the operational concepts for future vessels should seek to enhance these capabilities while mitigating the enemy's capabilities to disrupt them. Specific roles could include command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR), Anti-Surface Warfare (ASuW), ASW, MCM, and armed escort; more important than any specific mission, however, is the capability to incorporate technologies not even imagined when the keel was laid. Concretely, this requires room for growth.

#### **4.4.4. General guidance for development and adquisition**

In order to comply with U.S. law, the vessel must be built in a U.S. shipyard. In order to minimize cost, it should prioritize simplicity, small crew size, and use an existing design, ideally in current or recent production.

#### **4.4.1. SOUTHCOM presence requirements and fleet architecture**

Inputs for operational presence requirements include Admiral Tidd's testimony on the lack of a 1.0 presence for long and medium range ships; the Navy Team's planned and notional operational presence of 1.5 and 7.6, respectively; and CSBA's regional deterrence force of a 1.0 frigate presence in the Eastern Pacific and 1.7 patrol vessel presence in the Caribbean. The 1.5 operational presence requirement inferred from the Navy Team's study reflects current missions in the region that will likely endure as a function of the enduring security demands.

The present requirements do not express, however, the region's growing importance in the future, multipolar world's geopolitics. This geopolitical shift will require greater focus on – and the forces for – naval diplomacy and maritime cooperation. An additional 0.5 medium to long range ship operational presence and a 4.0 presence from shorter endurance patrol vessels would help satisfy this demand. Overall, this would give SOUTHCOM a 2.0 presence from long and medium range ships and a 4.0 presence from patrol vessels. This presence would be divided between a 1.0 presence for long and medium range ships in both the Eastern Pacific and Atlantic/Caribbean, and a 4.0 patrol vessel presence in the Caribbean.

The U.S. Navy generally needs roughly three to four ships to provide a 1.0 operational presence, though this ratio changes as a function of the platform, manning model and transit time, and can be as low as two ships per 1.0 presence for forward deployed ships (Hendrix, 2017). Factoring in the shorter transit from CONUS bases to the SOUTHCOM AOR, filling the requirements proposed above would take 4-8 medium to long range ships and 8-16 patrol vessels.

The LCS and/or the planned frigate could provide some or all of the medium to long range ship presence. Given the short transit times between CONUS bases and the SOUTHCOM AOR, and the potential for the new manning model to support greater presence, as few as four LCS could provide 2.0 operational presence within the SOUTHCOM AOR. The current plan, however, allocates all LCS deployments to other AORs (O'Rourke, 2017c, pp. 8-9). Because the LCS and frigate force allocation may very well follow its current pattern as a function of other GCC

requirements, the need for alternate platforms to fill SOUTHCOM's force requirements is even more pressing.

The three proposals below outline the basic characteristics of platforms that would contribute to SOUTHCOM Phase 0 presence requirements and Phase I/II/III mission requirements in other AORs.

#### **4.4.2. Replacement PC and evolutionary large USV platform**

Both the Navy and CSBA fleet architecture studies focus on the need for large USVs: the Navy study proposing an evolution of the 72-ton Mk-VI special operations craft, and the CSBA study proposing an even larger vessel with more endurance and better seakeeping, such as the experimental 145-ton Sea Hunter. The threshold endurance, range and payload capabilities in the recent USV RFI would favor a vessel that is at least as large as the Sea Hunter, if not larger.

A RAND Corporation study on surface USV employment conceptualizes the key enablers needed to capitalize on USV potential. These include autonomy, assured communications, modular payloads in common platforms, optional manning to mitigate autonomy challenges, and finally very long endurance (Savitz, et al., 2013, pp. 43-54). In large unmanned surface vessels, the technology, platforms and operating concepts for each of these key enablers have yet to mature individually; still more time will be required for effective integration.

Ambitious new technology takes time to mature and integrate. The slow, partially successful integration of unmanned and remotely operated mission modules with the LCS serves as a cautionary example. Whatever form the XLUSV eventually takes, it will require extensive developmental testing and evaluation to fully mature its autonomy and overall system reliability. The CNO's direction for taking "current operating concepts, platforms, and modestly incorporating technological upgrades as they unfold" (Richardson, 2017, p. 4) has particular application here. The XLUSV should not only be based on an existing manned platform, but should also follow a manning model that incrementally reduces the crew size as the unmanned system components mature, with the objective of ultimately producing an optionally manned or fully unmanned system.



Parallel to this burgeoning requirement to develop a large USV, the *Cyclone*-class PC (Patrol Coastal) will reach 30 years of service life in 2023-2026, despite having a designed service life of 15 years. Although the LCS program was intended to replace patrol vessels, minesweepers, minehunters and frigates, the LCS program has been truncated to 40 or fewer hulls (U.S. Government Accountability Office, 2016), and PCs continue to serve important missions as they approach the end of service life (LaGrone, 2017). The retirements of the *Perry*-class FFG and the *Cyclone*-class PC, the truncation of the LCS program, together with the higher capabilities and resultant lower numbers of the FF(X) program, all support a replacement PC that could quickly and cheaply supplement the lower end of the fleet architecture.

The U.S. Coast Guard (USCG) acquired the first 154-foot, 353-ton *Sentinel*-class Fast Response Cutter (WPC) in 2012 to replace the aging 110-foot *Island*-class cutters. The USCG has commissioned 22 of the planned 58 hulls, and a further 22 hulls are under contract. The overall program cost averages \$65M per cutter<sup>9</sup> (USCG, 2017) (Willis, Schwender, & Eggert, 2013), the most recent buy averaged \$54M, and future block purchases could take advantage of learning curves and sunk development costs to achieve further savings. The platform is substantially similar to the existing *Cyclone*-class.

The Navy should dovetail onto the Coast Guard's WPC program in order to take advantage of an active production line and acquire a replacement patrol craft that could also serve as a large USV development platform and potentially a large USV. This vessel could either be the same as the Coast Guard's vessel, to minimize cost, or incorporate slight modifications.

Phase 1 of this process would acquire at least 15 of these "Patrol, Coastal (Replacement)", or PC(R)s: 13 to replace the *Cyclone*-class at the end of their service life (2023-2026), and two as technology testbeds for unmanned system components. Selected weapons and missions systems would be transferred from the retiring *Cyclone*-class PCs to the new hulls, further reducing costs. Initially, the PC(R)s would fulfill an operational role similar to the *Cyclone*-class. The Defense

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<sup>9</sup> The FY17 budget allocated \$325 million for six vessels, or \$54.2 million each, including government furnished equipment (weapons systems, etc).

Advanced Projects Research Agency (DARPA) recently transitioned the *Sea Hunter* USV to the Office of Naval Research (ONR) for continued development testing (Owens, 2017); this same technology would be further developed in the replacement PC test vessels and prepared for wider implementation in the rest of the PC(R) fleet.

Phase 2 would gradually incorporate proven components of the unmanned systems, such as unmanned engineering spaces and semi-autonomous autopilot functions, as they mature in the testbed vessels. The increasingly automated vessels would exchange some of the space and weight needed for crew quarters and habitability systems (fresh water and sanitation tanks, food stores, etc.) for additional fuel and mission systems. This phase would further mature the unmanned technology while freeing the crews from bridge watch and engineering watches, allowing greater mission focus. This spiral development model would evolve a conventionally manned PC(R) into an optimally-manned and then minimally-manned vessel.

Phase 3 would produce operational USVs, with some vessels designed to have small crews as part of the mission package (e.g., for maritime interdiction or training visits), and others completely unmanned in order to perform the dirty, dull or dangerous missions for which a crew is a liability rather than an asset. This vessel could use the same hull as the PC(R) or leverage the mature technology into a more capable, purpose-built platform.

A recent study sponsored by the CNO's Surface Warfare Directorate (OPNAV N96) and conducted by MIT outlines the potential capabilities for a vessel similar to a fully evolved, unmanned version of the PC(R). The 318-ton vessel it proposes would carry a hull-mounted sonar, a SEA GIRAFFE air/surface search radar, a soft-kill self-defense system and a VLS, while also having a 10,000 NM range and a 60 day endurance (Finley, Mason, & Leavitt, 2017, p. 2). The appeal of these capabilities, and particularly the desire to see them fielded rapidly, should not distract from sound acquisition practices: Leveraging the Fast Response Cutter's production line would satisfy the *Cyclone*-class mission sets and eventually develop an operationally potent and technologically mature USV.

Initially the operating concept for the PC(R) would be fundamentally the same as existing PCs, both within the SOUTHCOM AOR and elsewhere. Although PCs have self-deployed across

oceans (Gilbert, 1999, p. 33), this capability is marginal, and recent deployments have used contracted heavy-lift shipping instead. This fact limits the vessel's operational flexibility. The *Montford Point*-class T-ESD (Expeditionary Transport Dock), which has a beam of 164 feet and a float-on/float-off capability, could transport 14-18 transversely loaded PC(R)s or similar, unmanned derivatives between operational theaters. These craft could be configured to perform missions including C4ISR, ASW, MCM, and armed convoy escort, depending on operational requirements (Savitz, et al., 2013, pp. 65-116).

If the PC(R) and its derivative USV can contribute to high end fleet operations in only one area, it should be C4ISR. DARPA appears to follow this same line of thinking: On 16 August, the USS *Zephyr* (PC-8) was seen towing an aerial mast system that vastly increases line of sight ranges for sensors and communication links. DARPA is also continuing the development of an automated launch and recovery system, which would facilitate the inclusion of this aerial mast on an USV (Hill, 2017b).

#### **4.4.3. Common Hull Auxiliary Multi-Mission Platform (CHAMP)**

The Navy Team and CSBA studies outline a new support vessel or tender to better enable the changing fleet architecture. Although the *Spearhead*-class EPF has been adapted as a multi-purpose, modular vessel in addition to its intended role as a fast intra-theater transport, its performance in these additional roles falls far short of a purpose built vessel (Eckstein, 2015).

This large, modular ship would eventually replace command ships (LCC), submarine tenders (AS), and hospital ships (AH); supplement existing expeditionary shipping (EPF, ESB, and ESD), and serve in the new role of large/extra-large USV/UUV/UAV tender. As an auxiliary/support vessel, it would be built to lower-cost commercial standards and incorporate modular features to better permit one hull design to perform a broad range of missions.

In the USV/UUV support configuration, it would broadly resemble an amphibious transport dock (LPD) with additional workshops, configured to transport, service and employ smaller vessels over long distances and with great endurance. Even though the larger USV's and UUV's operational concepts describe pier-side launch and recovery, the need to maneuver and deploy

these units to crisis areas and then service them without secure port facilities suggests the utility of a well deck for USV/UUV tenders, as noted by the Navy Team (2016, p. 14). The difficulty that davit and stern ramp systems have with larger vessels in higher sea states also recommends the well-deck capability (Hanyok & Smith, 2010). This capability could also support amphibious shipping by transporting amphibious connectors from CONUS to the sea base.

The basic design would displace 20,000-50,000 tons, and incorporate a helo deck, RORO capability, and large, configurable mission spaces. Construction trade-offs would include: a well-deck (and ballast capability) vs. an additional mission deck, and a large helo/UAV hanger vs. an open topside mission deck. The topside mission deck could be configured for an arsenal ship on the fly, even incorporating bulky Intermediate Range Ballistic Missiles (IRBMs) as proposed by the MITRE study (p. 62) and elsewhere (Tangredi, 2017). The ROM cost for this platform would fall somewhere between the \$180M EPF and \$500M ESD/ESB, depending on configuration and quantity acquired.

Phase 0 SOUTHCOM missions and employment concepts for such a vessel would include a hospital ship, training/security assistance, and an “ESB-lite” sea base configured for MIO: hosting and supporting PC(R)s, USVs, helicopters, UAVs and interagency/international partners. In the absence of LCS or frigate availability, the CHAMP would satisfy the SOUTHCOM 2.0 medium to long range ship presence requirement, and do so at roughly half the cost of the LCS or one third of the cost for the frigate.

Beyond the ship classes that CHAMP would directly replace, its roles throughout spectrum of conflict in the rest of the world would be myriad, limited only by the need to avoid direct combat and by the variety of modular packages.

#### **4.4.4. Heavy Lift Army Landing Craft (HLALC)**

The Heavy Lift Army Landing Craft (HLALC) concept was conceived as a 1,566 ton, surface effect ship (SES) Partial Air Cushion Supported Catamaran (PACSCAT) replacement for the U.S. Army’s *Runnymede*-class (LCU-2000) landing craft, designed to transport four M1A1 tanks or 300 tons of cargo 2,500 NM at 24 knots, directly to a beach. The concept is a scaled-down version of a larger craft that completed builder’s trials for the U.K. MoD. With a 10-12 person crew, 30

days endurance, and an open, roll-on/roll-off cargo deck, the vessel could provide considerable flexibility for a variety of missions, similar in concept to ONR's T-Craft, but reduced in complexity, cost, and capability (Abdelsalam, Luder, Shen, & Wohlenhaus, 2010). The AFPs for SOUTHCOM deployments would generally resemble those that have been deployed with EPFs, but with the additional access provided by a landing craft. It would be particularly useful for disaster relief and similar missions that require intra-theater lift with no port infrastructure. Bottleson (2001) outlines further alternate uses for landing craft in the littorals, capabilities that a larger, faster and more capable vessel (as compared to the legacy landing craft) would only improve.

Outside of the AOR, such a craft would contribute to the fleet mainly by providing a heavy lift surface connector with longer range and greater endurance than existing platforms, allowing the sea base an even greater standoff from A2AD threats. This vessel would largely satisfy the same basic operational considerations that motivated the ONR T-Craft concept, but with lower cost, capability and technology risk.

Within the context of the distributed lethality operational concept, the HLALC could assist distributed fires in two important ways suggested by the recent Marine Corps Operating Concept (MCOC). First, it could move USMC units from the sea base to capture and exploit expeditionary advance bases (EABs). Once established in these EABs, the USMC units would integrate their fires, including the M142 High Mobility Artillery Rocket System (HIMARS), to supporting the joint force in this contested environment. Second, the MCOC calls to: "Develop sea-based fires alternatives including from conventional guns with extended-range guided munitions, rail guns, missiles, and HIMARS or similar rocket launching system afloat" (Neller, 2016, p. 18). Similar to the software and sensor modifications that add an anti-ship capabilities to the existing BGM-109 Tomahawk Land Attack Missile (TLAM), HIMARS is being adapted to fire from one moving ship against another, a concept that the next RIMPAC exercise may develop towards an operational capability (Hill, 2017a). Each HLALC could carry 20 or more HIMARS vehicles, each equipped with a single MGM-140 Army Tactical Missile System (ATACMS), capable of delivering a supersonic, 500-lb warhead against moving ships out to 190 NM (Freedberg Jr., 2016). Rocket artillery vehicles with anti-ship capabilities would suffice for an initial, flexible capability ASuW capability, but using containerized missiles – loaded in a non-descript container

express (CONEX) units or more traditional box launchers – would give a deeper magazine and potentially better capabilities (Rubel, 2017), since the weight and space of the armored vehicles could be traded for more or bigger missiles. Unlike fixed VLS cells on surface combatants, which can only be reloaded in port, these launch platforms could be reloaded from the sea base by swapping out the vehicle, CONEX box, or missile canisters. Each HLALC could carry 80 missiles of similar weight and size to the SM-2 Standard missile (United Defense, 1998)<sup>10</sup> in lieu of the ASuW loadout. Many other vessels could serve in a similar role, but the HLALC's large, open cargo area would facilitate missile launching and lift-on/lift-off re-loading; the RORO configuration would facilitate vehicle loading; and the landing craft capability would permit the rapid distribution of these same weapons to EABs.

Finally, the HLCAC's simplicity and small crew suggest it for development into a USV or optionally-manned vessel, following the deliberate, evolutionary model of the PC(R) to USV transition outlined above. Distributing a network of such vessels throughout a contested maritime environment, each with 20 to 80 launch-on-remote anti-air or anti-surface missiles, would gain an operational advantage while incurring less risk than a similarly capable distribution of manned vessels.

#### **4.5. Conclusions**

The fundamental U.S. security interests described by the most recent National Security Strategy (NSS) will continue without profound alteration through 2045. While these interests will continue, both the geopolitical context and the global security environment will fracture towards multipolarity in the next 30 years. Within the SOUTHCOM AOR, the overall economic, social and security situations will improve moderately, though current security threats will persist, particularly on a sub-regional level. The force requirements needed to achieve U.S. regional

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<sup>10</sup> ROM based on a loaded Mk-41 VLS system, accounting for the missile and supporting launch system. Each 8 cell module weighs 56,400 lbs (25 tons, or 250 tons for 80 cells); 50 additional tons is assumed for supporting ship services (water, compressed air, heating and cooling). The Mk-56 VLS system is lighter, but the Mk-41 was chosen for this ROM to give a more conservative estimate.

interests in this security context should be about the same, as analogously projected from current force requirements. However, the plausible, relative diminution of U.S. power and influence on the world stage, and with it the reduced capability for the U.S. to unilaterally achieve its interests, will require greater cooperation with like-minded powers to achieve shared security interests. Operationalizing this grand strategic approach will require increased presence within the AOR, which a 4.0 PC presence and a 2.0 long/medium range ship presence would achieve. The fleet of 293 ships currently planned for 2045 is not adequate to make the appropriate contributions to NSS; more specifically, this fleet does not support the SOUTHCOM presence requirements. The PC(R), CHAMP, and HLALC embody the guiding principles of flexibly capability, affordability and availability. Acquiring one or more of these platforms in quantity would support SOUTHCOM presence requirements while making important contributions to likely operational concepts in other AORs.

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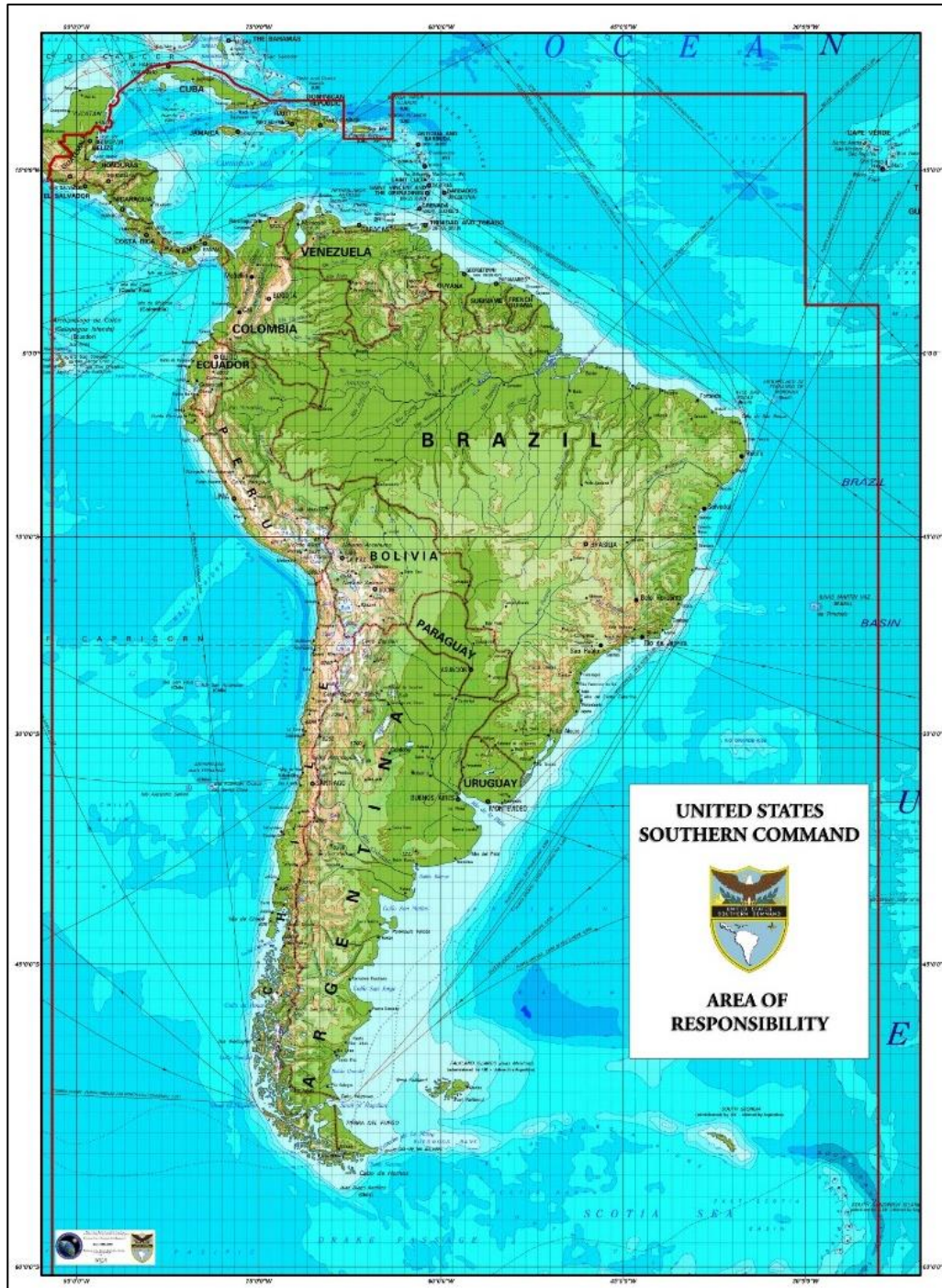


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## Appendices

### 6.1. SOUTHCOM Area of Responsibility



(U.S. Southern Command, 2017)